CHAPTER 3
AFFECTED ENVIRONMENT

Levee break near County Road 102 in 1983.

CHAPTER 3.0

AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing conditions (and future without project conditions where different) in the study area. These conditions are current to 2002, where possible; otherwise, the latest available data have been used. The information in this chapter serves as the comparison for project-induced effects (described in Chapter 4). Resources not affected by the project are described first (resources eliminated from detailed analysis), followed by the resources that may be affected by the project (affected environment). Resources eliminated from detailed analysis include climate; topography; geology; soils; recreation; hazardous, toxic, and radiological waste, public health vectors and vector control, and fisheries. The affected environment section discusses social and economic resources, land use, agriculture, prime and unique farmlands, transportation, noise, air quality, water quality, sedimentation and the settling basin, vegetation and wildlife, special-status species, cultural resources, and esthetic and visual resources.

3.2 Resources Eliminated from Detailed Analysis

Effects on several environmental resources were evaluated during the initial scoping process and found to be minor and insignificant. These resources are described below along with reasons for eliminating them from detailed analysis.

3.2.1 Climate

The Cache Creek basin experiences the same Mediterranean climate as the Sacramento Valley, characterized by hot, dry summers and mild, rainy winters. Summer temperatures usually are in the 90's and occasionally exceed 100 °F. Winter lows occasionally dip below freezing, but rarely drop below 20 °F. Annual rainfall averages are 17 inches near the town of Yolo and 32 inches for the entire basin; snowfall is very rare.

Prevailing winds are from the southwest and are caused by coastal wind passing from San Pablo Bay to Suisun Bay through the Carquinez Strait. Winds channeled through the Carquinez Strait bring southerly winds from the ocean in the summer and rainstorms in the winter. Prevailing winds are moderate in strength and vary from dry, overland wind from the north to moist, clean sea breezes from the south.

3.2.2 Topography

Topographic features of the Cache Creek basin vary from the steep hills of the eastern slopes of the Coast Range Mountains to the nearly flat valley floor. Elevations range from 6,000 feet at the north end of the basin to nearly sea level near the town of

Yolo. Stream channel gradients in the upper basin are steep; gradients in the lower basin are very small. Flood control and land reclamation levees provide some topographic relief in the relatively flat project area, ranging from 91 feet msl within the gravel mining reach to 35 feet msl (NAVD88) at the settling basin. Construction of the LCCFB and the Modified Wide Setback Levee plans would be consistent with existing topographic relief and would therefore not have a significant effect.

3.2.3 Geology and Soils

The study area is in both the Coast Range and the Great Valley geomorphic areas. The lower basin consists of continental deposits of silt-clay, sand, and gravel. The overlying alluvium deposits are similar and generally not as coarse as the continental deposits. This material forms significant aquifers that underlie the valley portion of the basin downstream from Rumsey. The size and extent of the aquifers are not known.

Lower Cache Creek flows on alluvial fan and flood plain deposits ranging from clay and silt to coarse sand and gravel (Wahler Associates, 1982). Borehole data show clay deposits to be common at depths in excess of 20 to 25 feet from the ground surface, whereas more recently deposited silt and sand characterize sediments above the 20-foot to 25-foot depth (Corps, 1958; Wahler Associates, 1982). Table 3-1 contains a list of existing soils types within the project area. Although construction of the LCCFB or the Modified Wide Setback Levee would disturb soils, there would be no loss of soils or soil types in the area and thus no significant effects on soils.

Table 3-1. Lower Cache Creek Project Area Soil Types

Soil Map Symbol	Soil Name	Prime and Statewide Importance Farmland Designation (where irrigated)
BrA	Brentwood silty clay loam, 0 to 2% slopes	Prime Farmland
Ca	Capay silty clay	Prime Farmland
Lg	Laugenour very fine sandy loam	Prime Farmland
Lm	Loamy alluvial land	(none)
Ma	Made land	(none)
Mb	Maria silt loam	Prime Farmland
Md	Maria silt loam, deep	Prime Farmland
Mo	Merritt silty clay loam, deep, drained	Prime Farmland
Ra	Reiff very fine sandy loam	Prime Farmland
Sn	Soboba gravelly sandy loam	(none)
Sp	Sycamore silt loam, drained	Prime Farmland
St	Sycamore silty clay loam, drained	Prime Farmland
Tc	Tyndall very fine sandy loam, drained	Prime Farmland
Ya	Yolo silt loam	Prime Farmland
Yb	Yolo silty clay loam	Prime Farmland
Wb	Willows clay	Statewide Importance

Source: Soil Survey of Yolo County, California (June, 1972)

Several faults are located in the vicinity of the project area. The Dunnigan Hills Fault is less than 5 miles northwest of the project area and is considered active due to recent activity during the Holocene epoch (the last 10,000 years) (Toppozada et al., 2000). Other faults in the region include the Zamora Fault and the Capay Fault, both of which are considered to be inactive (Jennings et al., 1994).

Lower Cache Creek has experienced a small amount of land subsidence due to ground water withdrawal. A maximum of 2.25 feet of cumulative land subsidence is estimated in the city of Woodland from 1942 to 1987.

3.2.4 Recreation

Yolo County has 11 parks and recreational facilities and about 1,256 acres that are accessible to the public. Cache Creek Canyon Regional Park, the largest park in Yolo County, is about 40 miles west of Woodland on SH 16. The park consists of three developed areas: upper, middle, and lower sites, plus acres of undeveloped land across the creek, for a total of 760 acres. This park also provides access to nearly 50,000 acres of U.S. Bureau of Land Management wilderness property. Cache Creek Canyon Regional Park offers picnicking, nature study, swimming, fishing, hiking and horseback trails, innertubing, and camping. Private outfitters offer whitewater rafting. Facilities at the middle site include 3 group and 45 individual campsites, along with picnic and parking areas. Yolo County operates one developed community park in Esparto off SH 16. Other parks in Yolo County are designated for open space or boat launching and bank fishing on the Sacramento River.

Parks in Woodland are operated and maintained by the City. The City also considers Woodland Joint Unified School District property available to assist in meeting the demand for parks and athletic facilities. It has been the City's policy to locate park facilities adjacent to public school sites whenever possible to use the school's open space. The City coordinates the park and recreational needs of the community with the Woodland Joint Unified School District. The school district works with the City to provide for joint use of the athletic facilities. The City operates 31 recreation facilities, comprising about 309 acres. Categories of city parks are listed below.

Neighborhood Parks: Neighborhood parks should fulfill recreational needs by providing open space, playing fields, play courts, picnic facilities, and playground apparatus. Neighborhood parks are about 10 to 15 acres. The city of Woodland has 15 neighborhood parks totaling 66 acres.

Special User Parks: Special user parks are playing fields, swimming pools, and special activities. Special user parks range from 1 to 16 acres. The city of Woodland has 15 special user parks totaling 78.5 acres.

Community Parks: Community parks are places where members of the entire community can congregate. The facilities include the typical neighborhood park facilities plus covered picnic areas, restrooms, and lighted softball fields and tennis courts.

Community parks should be 30 to 50 acres. The city of Woodland has no community parks.

Regional Parks: Regional parks are developed to serve more than one community. They should provide as many diverse recreational facilities as possible. They should also make use of the unique natural resources in the area. Regional parks should be, at a minimum, 50 acres or more. The city of Woodland has one 160-acre regional park on the site of the former city landfill, southeast of the city at the southeast corner of CR 25 and CR 102. This area is partially developed for recreational uses, but is not fully developed for regional park use.

The only recreational facility in the project area is Woodland Sports Park (Dubach Field). Dubach Field is an athletic field north of I-5 near the intersection of SH 113. This park is used for adult softball leagues. Of the 11 parks within the city of Woodland, 7 lie within the flood plain. The majority of the 7 parks are picnic and barbeque areas. Two fields, Camarena Field and Clark Field, have baseball diamonds. The city parks have little use during the winter months, but numerous city and county residents, including children and adults, use the parks during the remainder of the year.

Public access to Cache Creek in the project area is limited. Access is restricted as a result of private lands bordering the creek to the north and south, and locked gates at the entrances to the levees.

The levees constructed for either the LCCFB or the Modified Wide Setback Levee Plans would not be used for recreational purposes. No significant adverse recreational effects would occur as a result of either plan. Both plans would provide flood protection to recreational resources.

3.2.5 Hazardous, Toxic, and Radiological Waste (HTRW)

This section describes (1) the methods used to identify hazardous, toxic, and radiological wastes associated with the Lower Cache Creek Potential Flood Damage Reduction Project and (2) known HTRW sites within the project area.

Regulatory Framework

The policy of the Corps regarding HTRW sites is presented in Engineering Regulation 1165-2-132, developed in response to the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended. This policy for cost-shared projects stipulates that the non-Federal sponsor must ensure cleanup of a Corps' civil works project. When HTRW sites are identified, response actions must be acceptable to USEPA and applicable State regulatory agencies. Corps' policy also requires that each civil works project must include a phased and documented review to provide early identification of known and potential HTRW sites that may be affected by a proposed Federal project.

Methods and Results

In March 2000, a Phase I Environmental Site Assessment (ESA) was performed by the Environmental Design Section of the Corps Sacramento District. The site visit portion of the Phase I ESA encompassed Cache Creek, the existing levees, the settling basin, plus a 100-foot construction zone on the landside of the project. The records investigation included a 1-mile corridor on the landside of Cache Creek. The area investigated began at CR 94B above the town of Yolo and ended at the settling basin near the Yolo Bypass. In all, approximately 12 miles of Cache Creek and levees on both banks were evaluated.

The site visit had the objective of locating and identifying recognizable environmental concerns including asbestos, construction and demolition debris, drums, landfill or solid waste disposal sites, pits, waste disposal ponds or lagoons, wastewater, fill dirt, depressions, mounds, PCB-containing transformers, structures used for the storage of chemicals, and tanks. None of these items were observed within the project area during the site visit with the exception of pesticide (chemical) mixing trailers at one location. Although no spills were observed at the mixing location, the potential for spills remains. There were no soil, surface-water, or ground-water samples collected as part of the site visit at this location or any other location within the project area.

As part of the records review for HTRW sites within the project area, Environmental Data Resources, Inc. (EDR) conducted a search of 38 public databases. This search resulted in the identification of 12 potential HTRW sites. However, the sites had been investigated prior to this inquiry and had been subject to removal actions, as necessary. Thus they no longer pose environmental hazards. The status of the sites was confirmed through subsequent contacts with local and State regulatory agencies.

Local and State agencies contacted regarding information on HTRW sites within the project area included the Yolo County Agricultural Department, the Yolo County Department of Environmental Health Services, the California Department of Toxic Substances Control, and the State Water Resources Control Board. These agencies did not have records of HTRW incidences or sites beyond those identified by the EDR records search.

Gravel is mined within the western portion of the study area adjacent to Cache Creek. Because the gravel mining does not involve chemical extraction, there are no mining-related HTRW concerns beyond common fuels and lubricants used to operate and maintain the mining equipment.

Surface water and sediment flowing from upgradient sources contain elevated concentrations of boron and mercury. Elevated boron is a result of naturally occurring mineral spring sources, whereas mercury presence results from mercury mining and natural minerals. During periods of lower streamflow in Cache Creek, boron precipitates along the banks of the creek. Mercury remains in creek bottom sediments. Both elements are an HTRW concern for reuse of streambank soil and creek bottom sediments. The

potential effects of boron and mercury on water quality are discussed further in Section 4.9.

Groundwater in the project area is typically shallow and in contact with surface water for most of the year. Based on available data, ground water is not affected by manmade chemicals, but there are localized areas of elevated boron concentrations due to naturally occurring soil minerals.

Other Wastes

Although not included within the Resource Conservation and Recovery Act (RCRA) definition of hazardous waste, agricultural chemicals and wastes (excluding some pesticides) do pose a danger if released into the surrounding environment. The area north of Cache Creek includes two agricultural chemical facilities: (1) Cache Creek Chemical, and (2) Agriform. They are both located near the junction of SH 113 and CR 18C.

3.2.6 Public Health Vectors and Vector Control

A vector is any organism that can serve as a transmission vehicle for a disease-causing agent. Insects such as mosquitoes, flies, fleas, and ticks are the most prominent vectors in the United States, along with animals such as rats and mice. Vector diseases are most often caused by a virus, protozoan, bacteria, or worm. Table 3-2 lists vector-borne diseases documented in the Sacramento-Yolo Mosquito and Vector Control District (SYMVCD), their causes, their transmission vectors, and their potential locations. All of these vector-borne diseases occur on a very limited basis within the SYMVCD.

Table 3-2. SYMVCD Vector-borne Diseases

Vector Disease	Disease-causing Agent	Transmission Vector	Potential Locations
Encephalitis	Virus	Encephalitis (*Culex tarsalis*) and wetlands (*Ochlerotatus melanimon*) mosquitoes	SYMVCD (most cases prior to 1960)
Malaria	Protozoan (*Plasmodioum*)	Western malaria (*Anopheles freeborni*), woodland malaria (*Anopheles punctipennis*), and coastal malaria (*Anopheles hermsi*) mosquitoes	Cases are acquired outside the U.S. through travel to infected areas
Canine Heartworm	Worm	Western treehole (*Ae. sierrensis*), western malaria, and *Ae. vexans* mosquitoes	SYMVCD, cases reported annually
Lyme Disease	Bacteria (*Borrelia burgdorferi*)	Western black-legged tick	One suspected case in Orangevale, CA (1992)
Plague	Bacteria (*Yersinia pestis*)	Infected fleas of wild rodents	Western United States
Weils Disease (*leptospirosis*)	Bacteria (*Leptospira interrogans*)	Infected animal urine/blood	United States
Bacterial Food Infection (*salmonellosis*)	Bacteria (*Salmonella*)	Infected animals	United States

Source: Sacramento-Yolo Mosquito and Vector Control District, 2002.

The SYMVCD takes the following actions to monitor and control vectors and vector diseases:

- Conducts surveys to track mosquitoes, ticks, and valley black gnats;
- Conducts surveys for western equine and St. Louis encephalitis, two vector diseases;
- Stocks mosquitofish in potential mosquito breeding habitat; and
- Applies environmentally compatible chemicals to suppress mosquito breeding.

The current SYMVCD vector control measures would ensure that there would be no additional effect due to the construction of a flood control project associated with Cache Creek.

3.2.7 Fisheries

The variable streamflow, shallow depths, and agricultural runoff in Cache Creek influence the number and type of fish found in the study area. A stream habitat survey of lower Cache Creek was conducted in July 1997 and overseen by Dr. Peter Moyle of UC Davis. Seventy-seven percent of the fish netted within the creek were red shiners. Other

members of the minnow family found within the creek include Sacramento squawfish, Sacramento blackfish, carp, speckled dace, and hitch. Warmwater sport fish such as catfish and large and smallmouth bass are also present. Historically, fish populations in Cache Creek included anadromous species such as steelhead trout, chinook salmon, and the Pacific lamprey. Fish collecting surveys (for mercury) conducted by Darell Slotton and Shaun Ayers of UC Davis in the fall of 2000 provided evidence of several salmon and a possible redd within lower Cache Creek. Due to flood control actions, including the settling basin and agricultural withdrawals, fish migration between the Sacramento River and Cache Creek is limited; however, not precluded. Lower Cache Creek has been designated as critical habitat for the Central Valley Steelhead and Essential Fish Habitat for the Central Valley fall-run chinook salmon.

Due to the already degraded nature of Cache Creek, there would be no additional effects to fisheries within the creek. Nevertheless, NMFS has declared Cache Creek to be special-status species' critical habitat and essential fish habitat. These details are discussed in Section 3.3.10 (Special-Status Species).

3.3 Affected Environment

This section describes existing conditions for resources that may be affected by the project.

3.3.1 Social and Economic Resources

Yolo County

The project area is located in Yolo County. The area is primarily rural and sparsely populated. The largest urban center in the county is Davis. According to the State Department of Finance (2000), Yolo County had a population in 2000 of 162,900 (California State Department of Finance, 2000).

In 1991, per capita personal income for Yolo County was $19,320. This was below the State average of $20,689, although not below the State poverty level (California State Department of Finance, 2000). The population of Yolo County is made up of 65 percent Caucasian, 22 percent Hispanic, 10 percent Asian/Pacific Islander, 2 percent black, and 1 percent Native American according to 1999 data (California Demographic Research Unit Report, 2001). Within the project area there are no designated affordable housing units.

Agriculture is an important source of employment and tax revenue for Yolo County. Agriculture employs two types of workers: migrant workers, who are bussed in for seasonal work, and permanent workers, who live in the area and work year-round. Together, these workers farm close to 540,000 acres of land within Yolo County (1997 Census of Agriculture). Currently, agricultural production in Yolo County is in transition from the production of field crops such as sugar beets and tomatoes to more economically stable production of tree and vine crops. A number of factors have led to this change. Internationally produced products such as sugar and canned tomatoes are available at a lower price than domestically produced products. Proper management of field crop

production includes the production of wheat and corn for crop rotation; wheat and corn are also subject to fluctuations in world market prices and generally do not return a profit. Production of field crops has driven domestic prices down to a level that makes it very difficult for Yolo County farmers to obtain a reasonable price for produce. Tree and vine crops such as nuts and fruit provide a more stable income for valley growers and can be harvested yearly. However, tree and vine crops take time to become established before they become productive.

Public services in the study area are provided by the counties and their cities. Services include schools, libraries, roads, utilities, and emergency services. Within the project area, there are no major utility corridors. The majority of the residents in the unincorporated area have septic systems and wells that eliminate the need for water and sewer mains originating from Woodland. Utilities such as electric, and communications run primarily along the major roads through the project area (CR 102, 101, SH 113 and 16, and CR 99) before branching out to serve more remote customers. Closer to Woodland city limits there are gas, water and sewer pipes as well as electric and communications that serve local businesses and residents.

The populations of the counties in the study area are expected to continue to grow at a rate higher than that of the State, primarily due to the influx of people who work in Sacramento and the Bay Area. Since the counties are attempting to preserve agricultural land, future development is planned adjacent to existing urban areas. County plans include additional housing, schools, water systems, and other public facilities. This future growth would occur with or without a Federally sponsored flood damage reduction project.

City of Woodland

The city of Woodland is the largest incorporated community within the study area. On average, the city is experiencing a 1.7 percent growth rate based on the General Plan buildout population as explained by Steve Harris (pers. comm., 2002). The 1980 population, 30,235, increased by 10,019 during the 1980's. During the 1990's, the population increased by over 6,000, for a 2000 census of 46,300 (Department of Finance, 2000). The January 1, 2001, population of the city of Woodland was estimated to be 50,614 persons. This represents an increase of 10,360 persons over the last decade.

Originating as an agricultural support community, Woodland remains surrounded by agricultural lands. As part of its current development planning, Woodland has directed separation of its residential development from existing and planned industrial development. Land use designations from the General Plan show most industrial development planned for the northeastern parts of the city, which are also within the FEMA 1 in 100 chance flood plain. Residential areas lie primarily to the west of downtown, with current developments to the south.

There were an estimated 17,438 housing units of all types in Woodland as of January 1, 2001: 10,986 single-family homes, 5,476 multiple family homes, and 854 mobile homes (California Demographic Research Unit Report, 2001). (Housing type

breakdown is based on the percentages of housing types published in the 1996 Woodland General Plan). Within the FEMA 1 in 100 chance flood plain are 3,500 homes including 3,200 single-family homes and 300 multiple-family homes. There are also an additional 500 structures (industry, retail, and restaurants) that lie within the FEMA 1 in 100 chance flood plain.

The police department and fire department within the city of Woodland are both located on Court Street just east of College Street. Woodland Memorial Hospital, the only hospital in Woodland, is located on California Street near Gibson Road. There are approximately 40 public facilities that lie within the FEMA 1 in 100 chance flood plain (Figure 3-1). Included in this count are health facilities, schools (5 of the 18 located within Woodland), a library, the wastewater treatment plant, and a firehouse.

Town of Yolo

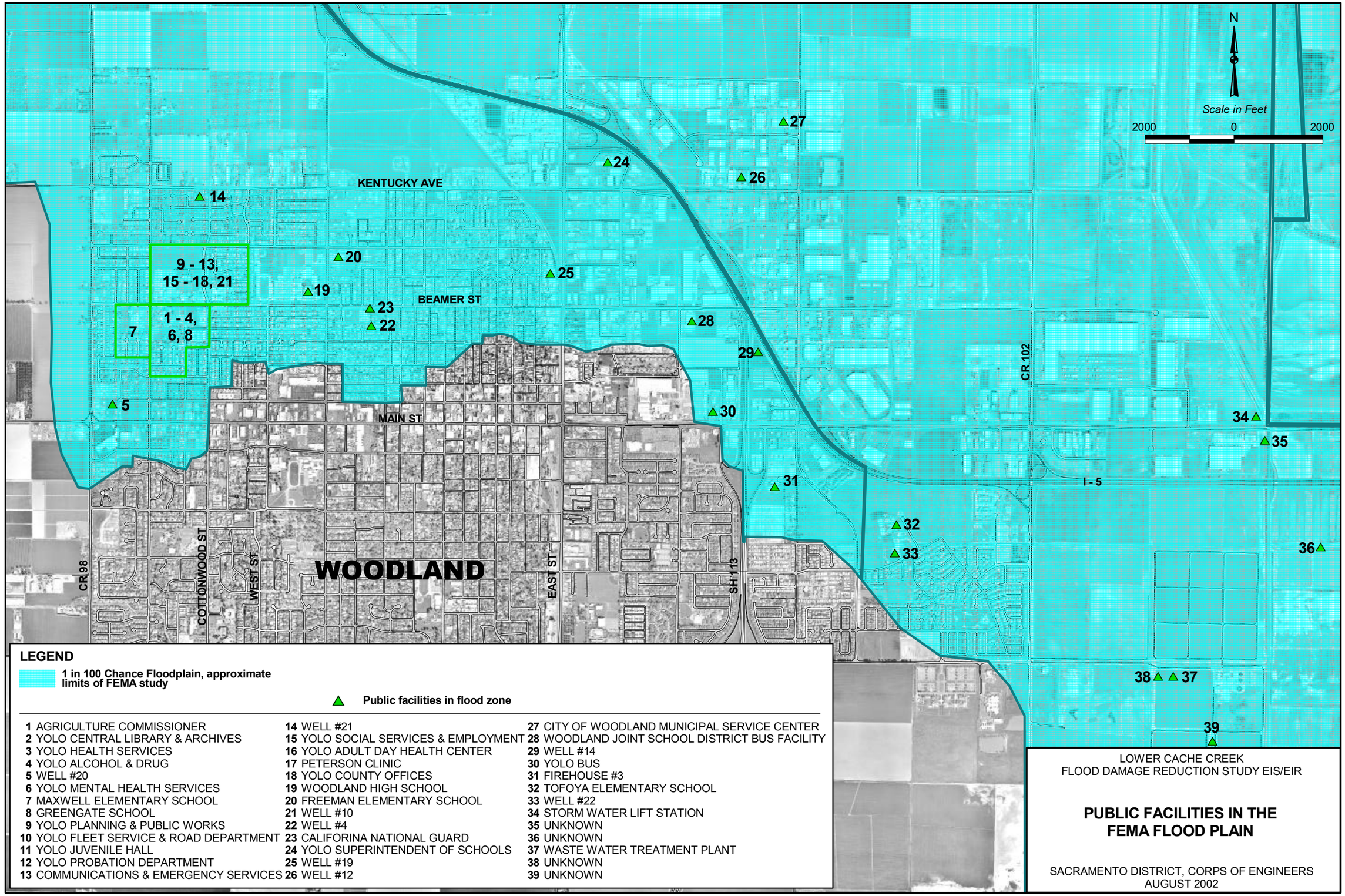
The population of the town of Yolo as of 1997 was 457 (Allen, pers. comm., 2002). There were an estimated 161 housing units in the town of Yolo according to 1997 data. There is one school within the town of Yolo. The town of Yolo has no hospitals.

3.3.2 Land Use

Agriculture comprises a majority of Yolo County. According to the 1997 Census of Agriculture, close to 540,000 acres of land were in farms. Land use specific to the project area follows this trend; agriculture is the predominant land use, comprising about 66 percent of the total project area. Other land uses include urban and industrial, residential, and flood damage reduction (Figure 3-2). Leading crops include wheat and grains, fruits and nuts, and tomatoes.

Land use in the southern part of the study area includes the city of Woodland and related residential, commercial, and industrial buildings and appropriate streets and roadways. Industrial land use is heavily concentrated to the east and northwest of the city of Woodland. Land use to the north of Cache Creek includes the unincorporated town of Yolo and a mixture of agricultural croplands, orchards, and individual residences. There is minimal development along Cache Creek.

Prior to designation of the city of Woodland within the FEMA 1 in 100 chance flood plain, it was predicted that the eastern area of Woodland would continue to develop for industrial use and the area to the south for industrial and residential use. Growth would provide increased economic opportunities and generate a substantial need for new housing, additional water supply, increased sewage capacity, new schools, and other public infrastructure and services.



LEGEND

1 in 100 Chance Floodplain, approximate limits of FEMA study

▲ Public facilities in flood zone

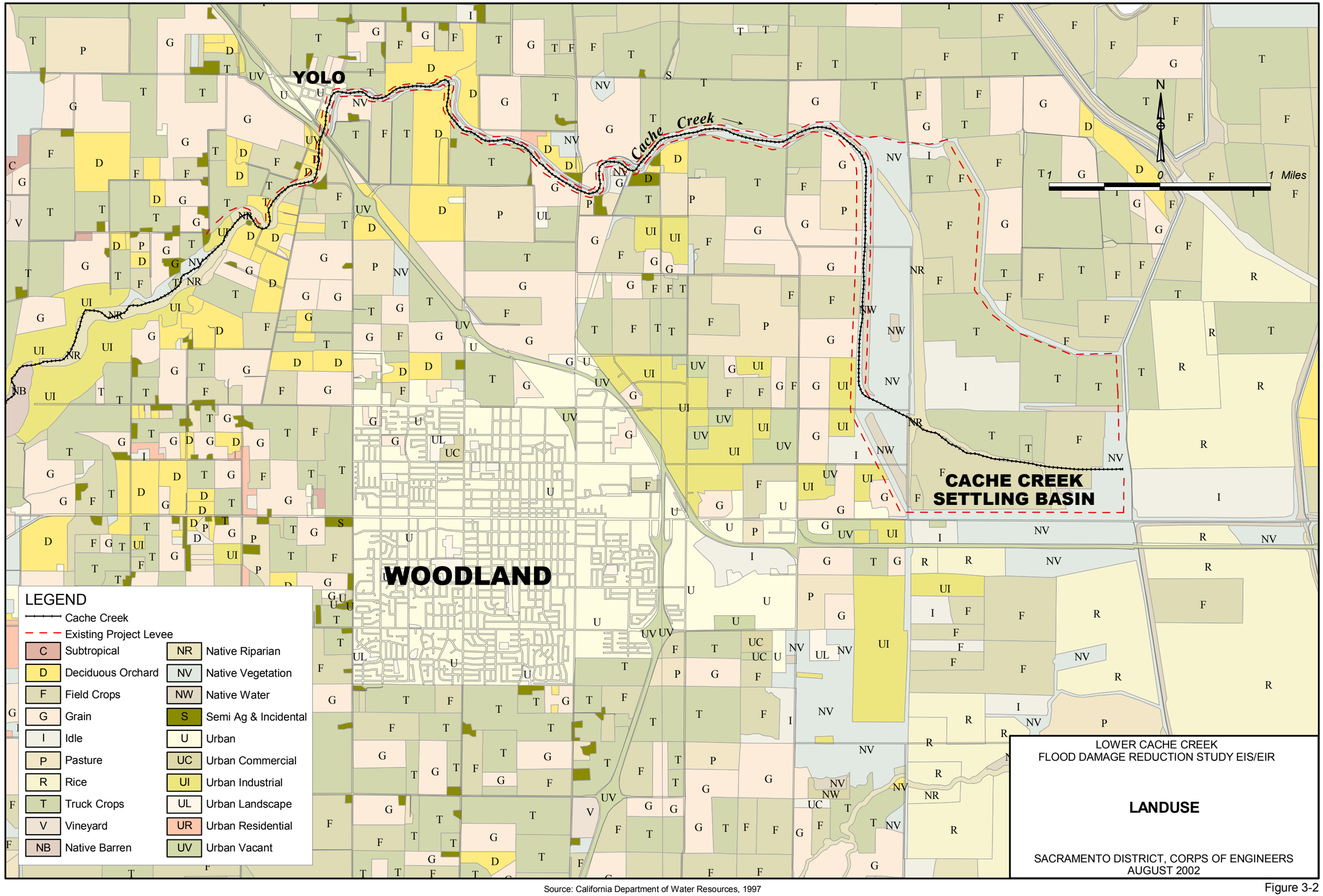
1 AGRICULTURE COMMISSIONER	**14** WELL #21	**27** CITY OF WOODLAND MUNICIPAL SERVICE CENTER
2 YOLO CENTRAL LIBRARY & ARCHIVES	**15** YOLO SOCIAL SERVICES & EMPLOYMENT	**28** WOODLAND JOINT SCHOOL DISTRICT BUS FACILITY
3 YOLO HEALTH SERVICES	**16** YOLO ADULT DAY HEALTH CENTER	**29** WELL #14
4 YOLO ALCOHOL & DRUG	**17** PETERSON CLINIC	**30** YOLO BUS
5 WELL #20	**18** YOLO COUNTY OFFICES	**31** FIREHOUSE #3
6 YOLO MENTAL HEALTH SERVICES	**19** WOODLAND HIGH SCHOOL	**32** TOFOYA ELEMENTARY SCHOOL
7 MAXWELL ELEMENTARY SCHOOL	**20** FREEMAN ELEMENTARY SCHOOL	**33** WELL #22
8 GREENGATE SCHOOL	**21** WELL #10	**34** STORM WATER LIFT STATION
9 YOLO PLANNING & PUBLIC WORKS	**22** WELL #4	**35** UNKNOWN
10 YOLO FLEET SERVICE & ROAD DEPARTMENT	**23** CALIFORINA NATIONAL GUARD	**36** UNKNOWN
11 YOLO JUVENILE HALL	**24** YOLO SUPERINTENDENT OF SCHOOLS	**37** WASTE WATER TREATMENT PLANT
12 YOLO PROBATION DEPARTMENT	**25** WELL #19	**38** UNKNOWN
13 COMMUNICATIONS & EMERGENCY SERVICES	**26** WELL #12	**39** UNKNOWN

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

PUBLIC FACILITIES IN THE FEMA FLOOD PLAIN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

FIGURE 3-1



Source: California Department of Water Resources, 1997

Figure 3-2

Since 1965, Woodland has become more urbanized as more than 150 new manufacturing and distribution centers have moved into the area. Currently, over 3,000 acres in Woodland are used for industrial purposes. The city of Woodland General Plan identifies an Urban Limit Line that encompasses all land to be considered for urban development within the timeframe of the General Plan (by 2020). The Citywide Growth and Development Implementation Program of the General Plan includes the following policy, "1.A.12 The City shall establish a permanent urban limit line around Woodland to permanently circumscribe urban development and preserve surrounding agricultural lands. The western and northern boundaries are the Urban Limit Line boundaries…" Figures 3-3 and 3-4 show zoning for the city of Woodland and parts of Yolo county including the town of Yolo.

In order to attain "high-quality, orderly growth to achieve a balance in residential, commercial, and industrial development"(City of Woodland, 1996), the City of Woodland outlines the following land use goals in its General Plan:

- Goal 1.A: To grow in an orderly pattern consistent with economic, social and environmental needs, providing for continued small-town character and preservation of surrounding agricultural lands.

- Goal 1.B: To provide adequate land in a range of residential densities to accommodate the housing needs of all income groups expected to reside in Woodland.

- Goal 1.C: To provide for new residential development in planned neighborhoods to be developed at an orderly pace and style and designed to promote walking, bicycling, and transit use, including the use of a modified grid system.

- Goal 1.D: To conserve and enhance the best qualities of existing residential neighborhoods as the city grows.

- Goal 1.E: To designate adequate commercial land for and promote development of commercial uses compatible with surrounding land uses to meet the present and future needs of Woodland residents and visitors and to maintain Woodland's economic vitality.

- Goal 1.F: To develop and maintain an economically-viable and physically-attractive Downtown.

- Goal 1.G: To revitalize and maintain the East Street Corridor as an economically-viable and physically-attractive mixed-use corridor.

- Goal 1.H: To designate adequate land for and promote development of industrial uses to meet the present and future needs of Woodland residents for jobs and to maintain Woodland's economic viability.

- Goal 1.I: To promote the productivity of agricultural lands surrounding Woodland and the continued viability of Yolo County agriculture.

- Goal 1.J: To maintain land as Urban Reserve for consideration for future development.

- Goal 1.K: To maintain and enhance the quality of Woodland's major corridors, city entrances, landscape, and streetscape.

The Yolo County also outlines goals for land use policy. The following are included in Yolo County's General Plan:

- Wise land use based on both physical and social characteristics of the County.

- Protect prime and other agricultural land from urban development.

- Provide for industrial growth in the County to provide employment, services, and tax base while minimizing hazards and nuisances and while conserving resources and agricultural lands.

- Establish natural and wildlife areas (preserves).

- Create urban spaces, green belts, and scenic highways.

- Make land use compatible with culture and rural setting.

- Discourage urban sprawl.

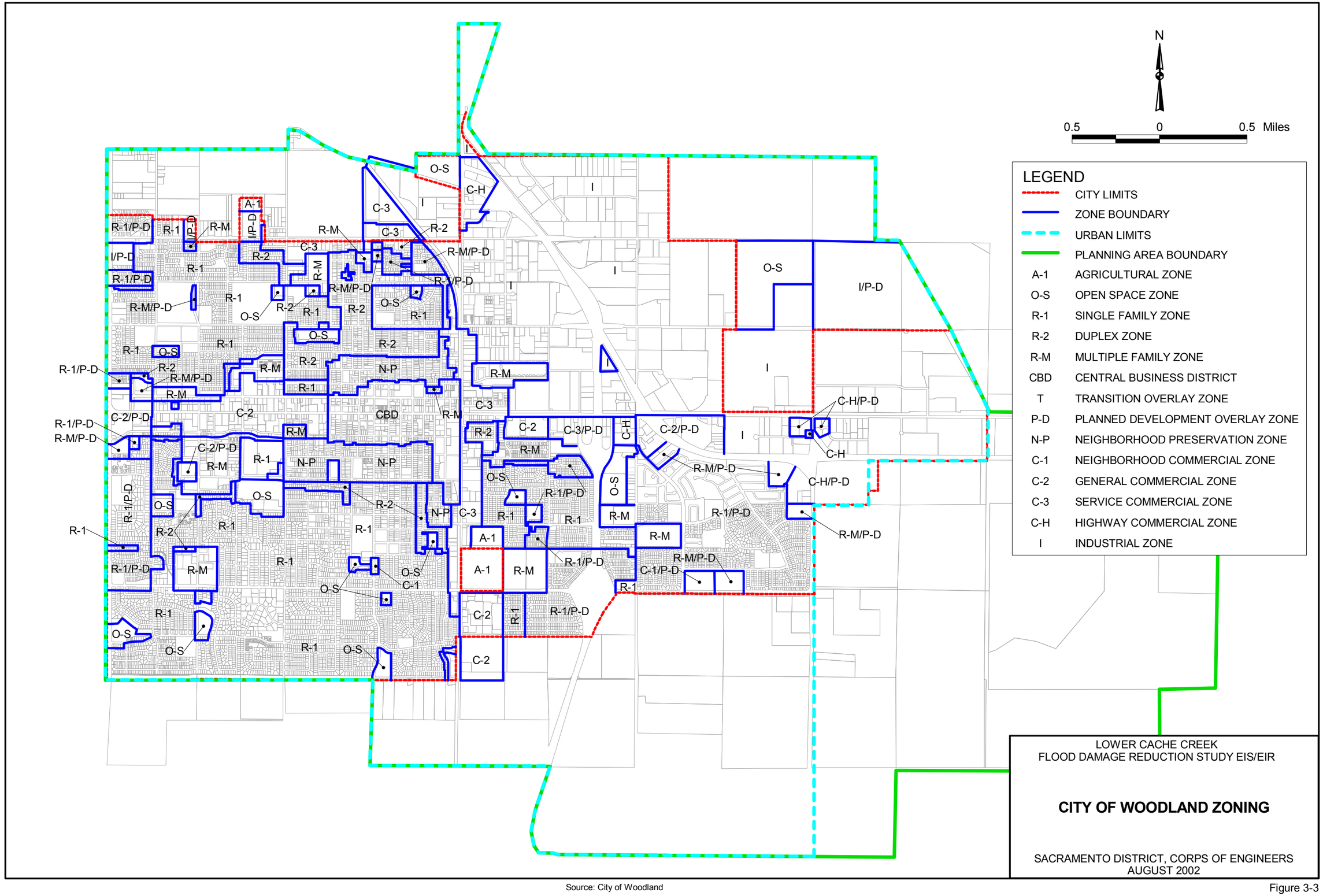
- Continue to improve existing urban uses and place new urban uses in existing planned urban uses.

- Protect property values.

- Assure that the costs of new development are borne by the beneficiaries of such development.

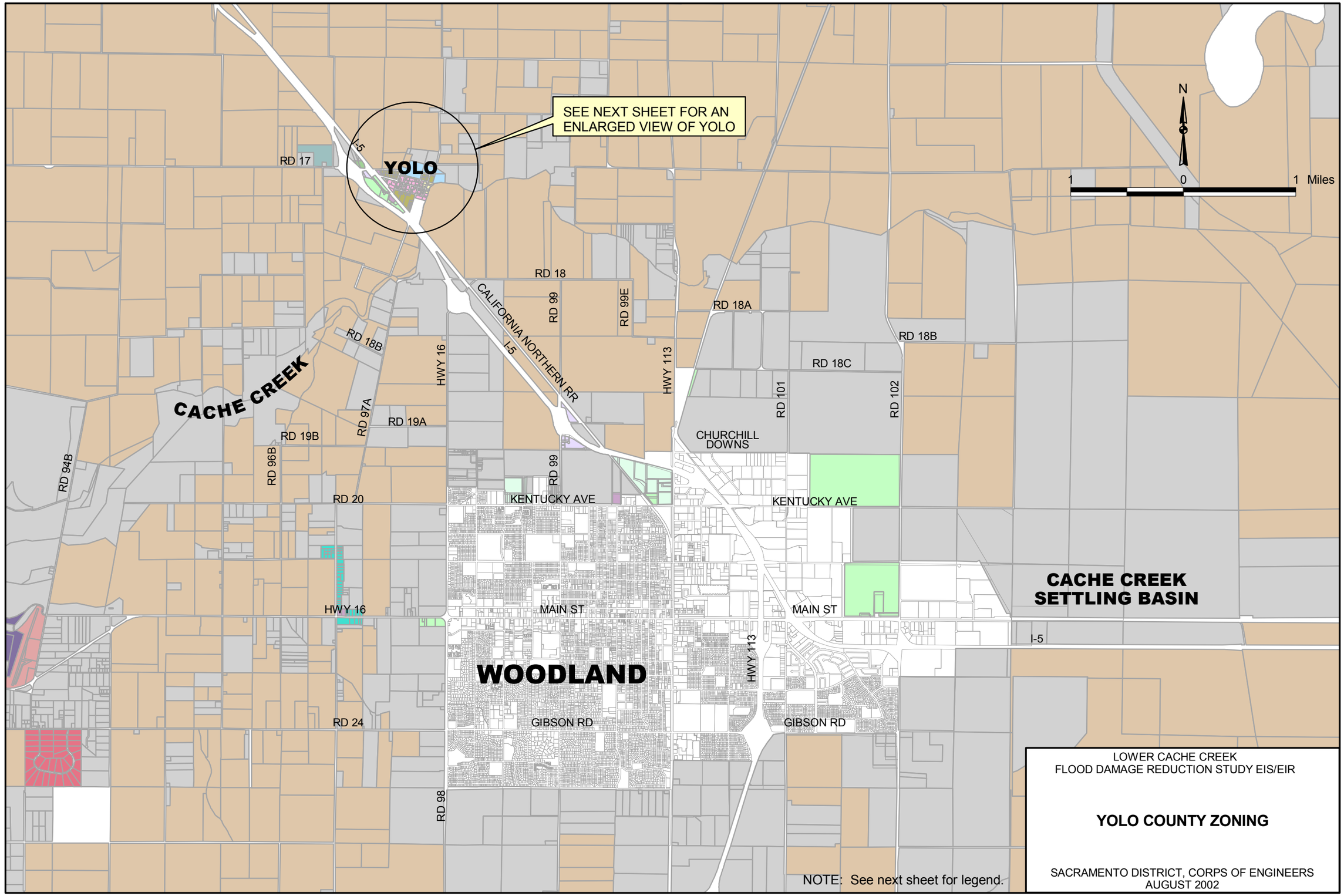
3.3.3 Agriculture, Prime and Unique Farmland

In 1980, the California Department of Conservation (CDC) joined the Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) in mapping the Nation's important farmlands. The designation of prime farmland was a result of this project. A continual conversion of agricultural lands made necessary the Farmland Protection Policy Act, passed in 1981 and amended in 1994. The act called for awareness of the effects that Federal programs had on the Nation's farmlands. To address this issue, the U.S. Department of Agriculture (USDA) developed the following as major requirements (Corps, 1998):



Source: City of Woodland

Figure 3-3



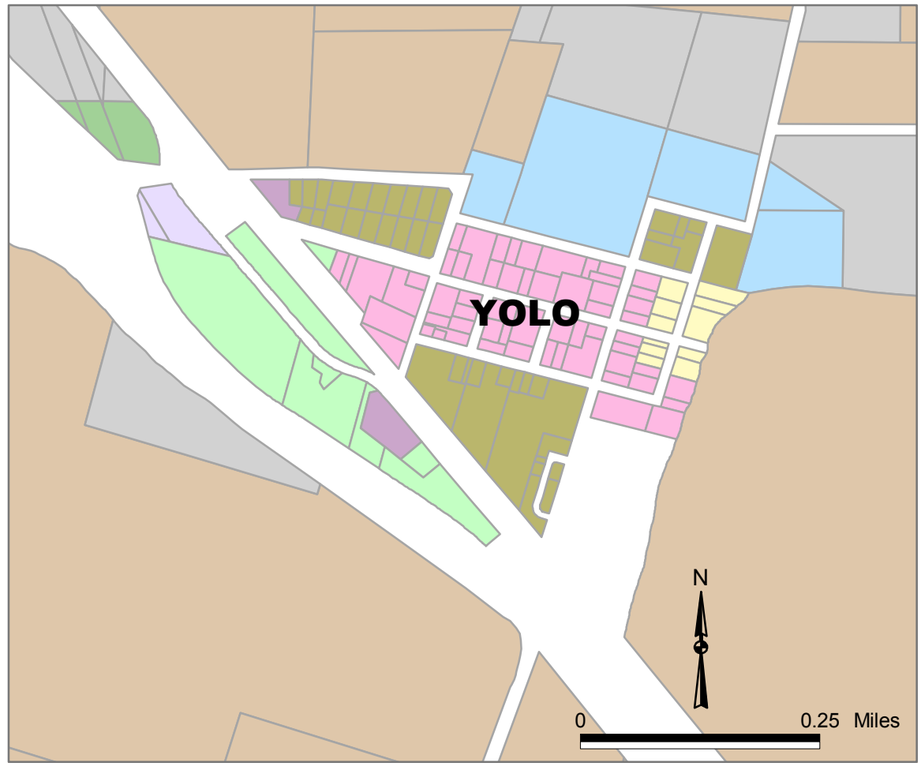
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

YOLO COUNTY ZONING

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Source: Yolo County Planning and Public Works Department

Figure 3-4, SHEET 1 of 2



LEGEND

A-1	Agricultural General (Ag. Gen.)
A-E	Agricultural Exclusive
A-P	Agricultural Preserve
A1/CH	Ag. Gen/Highway Service Commercial
AV	Airport
C1	Neighborhood Commercial
C2	Community Commercial
CH	Highway Service Commercial
M1	Light Industrial
M2	Heavy Industrial
PD-45	Planned Development 45
R1-PD	Residential, One Family-Planned Development
R2	Residential, One Family or Duplex
R2-B28	Residential, One Family or Duplex: 28,000 sf minimum parcel
R3	Residential, Multi-Family
RS	Residential, Suburban
RS-B130	Residential, Suburban; 130,000 sf minimum parcel

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

YOLO COUNTY ZONING

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Source: Yolo County Planning and Public Works Department

Figure 3-4, SHEET 2 of 2

(1) Federal agencies must use the USDA's criteria to identify and take into account the adverse effects of their programs on the preservation of farmland.

(2) Federal agencies must consider alternative actions, as appropriate, to reduce such adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local, and private programs.

The act also gives authority to local governments to designate farmland of local significance and exempts land already tagged for urban development. The following terms are defined by the NRCS, as they pertain to California (Corps, 1998):

"Prime Farmland" is land with the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture regime needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime farmland must have been used for the production of irrigated crops within the last three years. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

"Farmland of Statewide Importance" is land other than prime farmland with a good combination of physical and chemical characteristics for the production of crops. Like prime farmland, it must have been used for the production of irrigated crops within the last 3 years. It also does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

"Unique Farmland" is land that does not meet the criteria for the preceding categories, but is currently used for the production of specific high-economic-value crops. This land has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality and high yields of a specific crop when treated and managed according to current farming methods. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

According to 1998 data, 63 percent of agricultural land located within Yolo County is designated as Prime, Unique, or Locally or Statewide Important Farmland (California Department of Conservation, 2002). These lands are generally located in the eastern half of the county. Within the project area, there is prime farmland and farmland of statewide importance (Figure 3-5). These farmlands can be found entirely surrounding the city of Woodland extending west to the Woodland Municipal Airfield and east, north, and south to the county line. In order to continue to preserve this valuable agricultural land, Yolo County has incorporated into its General Plan an Urban Area Boundary and Community Area Plan for the County's cities, outside of which only agricultural development would be allowed.

Projects that are subject to the requirements of the Farmland Protection Policy Act include any projects that may irreversibly convert (directly or indirectly) farmland to nonagricultural use, and are completed by a Federal agency or completed with the assistance of a Federal agency. If a project falls under this Act, a Farmland Conversion

Impact Rating Form supplied by the NRCS must be completed. Information supplied by both the NRCS and the sponsoring federal agency results in a numeric score from which the alternative would be assessed. Higher point totals require additional alternatives to be evaluated.

3.3.4 Transportation

The following section describes the existing roadway functions, traffic volumes, airports, rail service, transit, and bicycle routes that may be affected by the proposed project. Figure 3-6 shows transportation routes through the project area.

Highways and Roadways

State Highways – One interstate and two State highways provide transportation through the project area. I-5 provides north-south circulation through the eastern portion of the project area. SH 113 also provides north-south circulation, but through the middle of the project area. SH 16 provides north-south circulation through the western portion of the project area. With the exception of I-5, a four-lane highway, all other roads in the project area are two lanes.

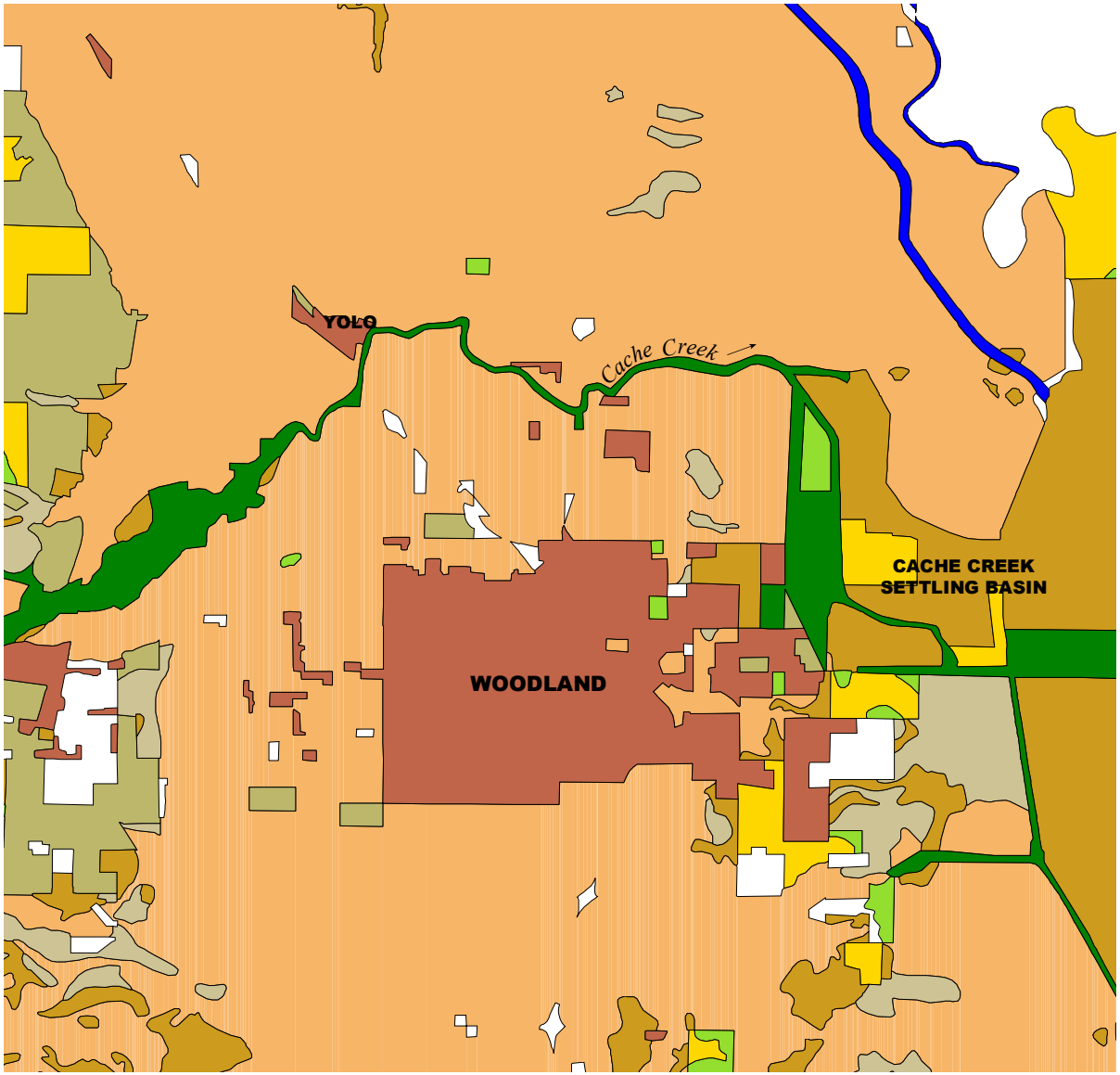
County Roadways – The majority of the roadways in the project area are county roads. The most heavily traveled county road in the project area is CR 102 which runs north-south. CR 102 is one of two county roads that cross Cache Creek in the project area; the second is CR 99W. CR99W runs parallel to I-5 and serves mostly local traffic to and from the town of Yolo. Other county roads in the project area include (north-south circulation) CR 101, 99, 97A, and 96B and (east-west circulation) CR 18C, 18A, 18, 19A, 19B, and 20.

City Roadways – Although south of the project area, city roadways may be used as haul routes. Kentucky Avenue runs east-west in the northern portion of the city of Woodland. A two-lane road, Kentucky Avenue is designated as a truck route by the City of Woodland's General Plan.

Traffic Types and Volumes

All roadways within the project area are traveled on by automobiles, trucks, buses, motorcycles, emergency vehicles, and with the exception of I-5, agricultural equipment. A brief discussion of bicycle traffic is also described below.

The Caltrans Traffic Operations Program reports average daily traffic volumes (ADT) on interstates and State highways. Additional traffic volumes were obtained from Yolo County. Annual average daily traffic for State highway sections through Yolo County and the intersections of county roads in the study area are provided on Tables 3-3 through 3-6.



N

SCALE IN MILES

5 0 5

LEGEND

Yolo1998

- Urban and Built up Land
- Grazing Land
- Farmland of Local Importance
- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Water
- Farmland of Local Potential
- Cache Creek
- Other Land

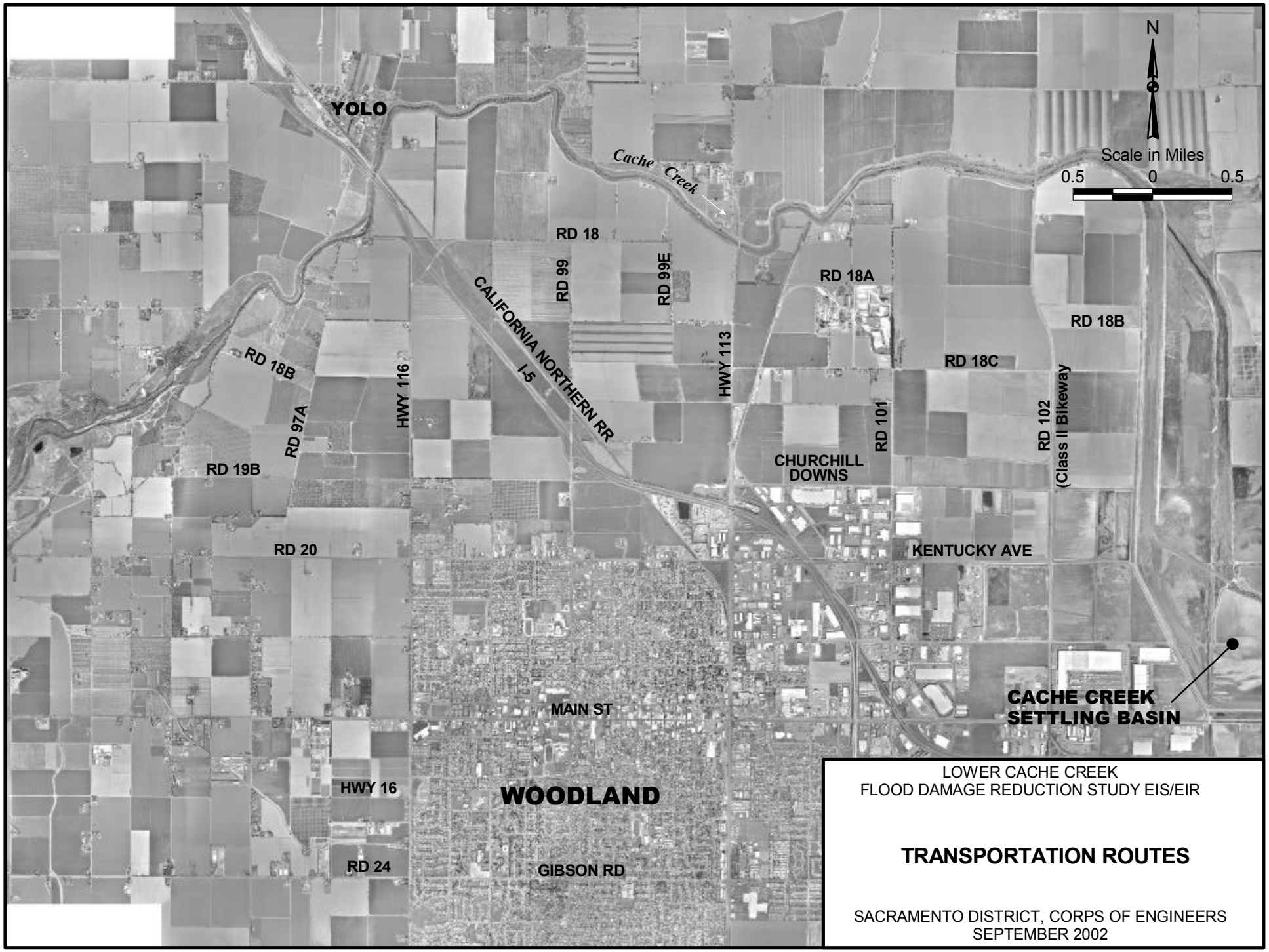
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

FARMLAND OF IMPORTANCE WITHIN PROJECT AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Source: California Department of Conservation, 1998

Figure 3-5



LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

TRANSPORTATION ROUTES

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SEPTEMBER 2002

Figure 3-6

Traffic volumes are also described by level of service (LOS) categories depicting the overall amount of traffic congestion on roadways. Yolo County is currently in the process of gathering data and calculating LOS for area roadways. This information will be included in the final EIS/EIR.

Table 3-3. Annual Average Daily Traffic (AADT) for I-5 Through Study Area

I-5 AADT (Annual ADT)		South			North		
Post Mile	**Description**	**Peak Hr**	**Peak Mo**	**AADT**	**Peak Hr**	**Peak Mo**	**AADT**
0	Yolo County Elkhorn Road	3950	52000	47500	3700	45500	41000
5.53	CR 102	3700	45500	41000	3050	39500	38000
6.51	Woodland, East Main Street	3050	39500	38000	2900	38000	34000
7.09	Woodland, Jct. Rte. 113 S.	2900	38000	34000	2950	36000	32000
8.26	Woodland, Jct. Rte. 113 N.[1]	2950	36000	32000	2900	37000	31000
9.41	CR 99/West Street[1]	2900	37000	31000	2300	28000	23500
10.81	Jct. Rte. 16, County Road 18[1]	2300	28000	23500	2150	24300	21000
12.34	Yolo Interchange, County Road 17	2150	24300	21000	2150	22800	19500
17.62	Zamora Interchange, County Road 13	2150	22800	19500	1900	22500	18500
22.61	Jct. Rte. 505 South	1900	22500	18500	2900	35500	33500
23.79	CR 8	2900	35500	33500	2650	30000	28000
25.57	CR 6	2650	30000	28000	2700	30500	27000
28.92	Yolo County-Colusa County	2700	30500	27000	2550	30500	25500

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-4. Annual Average Daily Traffic (AADT) For SH 113 Through Study Area

SH 113 AADT		South			North		
Post Mile	Description	Peak Hr	Peak Mo	AADT	Peak Hr	Peak Mo	AADT
9.23	Woodland, Gibson Road	1550	18300	17000	1200	12800	12000
10.15	Woodland, East Main Street	1200	12800	12000	580	6000	5400
10.72	Woodland, Jct. Rte. 5	580	6000	5400			
11.44	Jct. Rte. 5[1]				610	7000	6600
12.33	CR P18C[1]	610	7000	6600	320	3950	3500
14.09	CR P100	320	3950	3500	270	3300	2900
18.66	CR P13	270	3300	2900	240	2800	2500
21.2	CR 102	240	2800	2500	700	8700	7800

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-5. Annual Average Daily Traffic (AADT) For SH 16 Through Study Area

SH 16 AADT		South			North		
Post Mile	Description	Peak Hr	Peak Mo	AADT	Peak Hr	Peak Mo	AADT
36.71	CR 94b	510	6400	5600	730	8200	7400
39.56	CR 97	730	8200	7400	810	10200	8600
40.57	West Main St/CR 98	810	10200	8600	600	7300	6500
41.3	West Woodland Avenue	600	7300	6500	470	5900	5100
41.57	Kentucky Ave/CR 20[1]	470	5900	5100	320	4300	3750
43.42	Jct. Rte. 5[1]	320	4300	3750			

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-6. Annual Average Daily Traffic for Intersections Within Project Area

Intersections	ADT
CR 102 and Churchill Downs	7,226
CR 101 and Road 18C	675
CR 99 and Kentucky Avenue	9,583
CR 101 and Kentucky Avenue	4,356

Source: Yolo County, November 2001

Airports

Two municipal airports and a number of private airports are located in Yolo County. Yolo County Airport is about 11 miles west of Woodland, and the University

Airport at Davis is about 11 miles southwest of Woodland. Commercial flight services are provided by Sacramento International Airport about 20 miles east of Woodland.

Transit

The Yolo County Transportation District operates Yolobus, the public transportation for Yolo County. Yolobus serves Woodland, Davis, West Sacramento, Madison, Esparto, Capay, Dunnigan, Yolo, Southport, Knights Landing, and Winters. Bus route 215 and 217 traverse the project area.

Bikeways

Bicycle and pedestrian travel within the study area is limited because of the rural character of the area. Currently, CR 102 is the only designated bikeway in the project area. The bikeway begins at the Woodland city/Yolo County line and continues north through the project area. Roadway width, specifically shoulder width, limits bicycle traffic on most roadways. Yolo County has planned additional bikeways for the future within the project area, for example on CR 99, however project start dates and funding sources have yet to be identified.

Railroads

Two railroads traverse the study area. The California Northern Railroad (CNRR) runs alongside I-5 between Cache Creek and the city of Woodland/Yolo County line. The Southern Pacific Railroad runs north-south through the project area on the east side of SH 113. Both railroads are branches of larger lines; locally, they serve the community's industries.

The CNRR traverses the project area on a railroad embankment. There are no elevated sections of the tracks except for the railroad bridge across Cache Creek just east of I-5. At the intersection of the tracks and Churchill Downs, warning gates are in place to alert vehicles and pedestrians of an oncoming train. The train does not carry passengers; it is solely a freight train serving local demand. The train schedules depend on necessity and do not run on a consistent basis.

3.3.5 Noise

Noise levels and effects are interpreted in relationship to noise-level objectives for each county. Sound is technically described in terms of loudness (amplitude) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Several rating scales have been developed to analyze the adverse effect of community noise. Development of these scales has considered that the potential effect of

noise on people largely depends on the total acoustical energy content of the noise, as well as the time of day when the noise occurs.

L_{eq}, the equivalent energy noise level, is the average acoustic energy content of noise during the time that it lasts. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during the exposure, no matter what time of the day or night they occur.

L_{dn}, the day-night average noise level, is the 24-hour average L_{eq}, with a 10-dBA "penalty" added to noise during the hours of 10 p.m. to 7 a.m. to account for the greater noise sensitivity of people at night.

Other noise measures give information on the range of instantaneous noise levels experienced over time. Examples include:

L_{max} is the maximum instantaneous noise level experienced during a given period of time.

L_{min} is the minimum instantaneous noise level experienced during a given period of time.

L_n values indicate noise levels that were exceeded "n" percent of the time. For instance, L_{50} is the noise level that was exceeded 50 percent of the time during a measurement period.

For each increase or decrease of 10 decibels, the sound would be perceived by an observer to be a doubling or halving of the sound. For example, an increase from 60 to 70 decibels would sound twice as loud. A change of 3 decibels is barely perceptible, whereas a 5-decibel change is readily perceptible.

The existing Woodland General Plan Noise Element is based on recommendations by the California State Office of Noise Control as contained in the Model Community Noise Control Ordinance and the Guidelines for the Preparation and Content of Noise Elements of the General Plan. The Noise Element contains exterior noise-level performance standards for locally regulated noise sources. These noise sources are typically referred to as stationary noise sources or nontransportation-related noise sources. Table 3-7 indicates noise compatibility with various land use types. Noise guidelines vary depending on proximity to different land uses. For instance, an acceptable decibel range in an industrial area may not be acceptable in a residential neighborhood.

The City of Woodland General Plan (1996) identifies noise sensitive land uses as residential, hospitals, motels, nursing homes, theaters, music halls, churches, offices, schools, libraries, museums, playgrounds, and parks. Within the project area, residences are the predominant sensitive noise receptors. Noise sensitive periods are generally from 10 p.m. to 7 a.m.; the Ldn add a 'penalty' for noise during this time period since people have a greater sensitivity to sound in the evening.

Table 3-7. Noise/Land Use Compatibility Guidelines for Community Noise Exposure (dBA, Ldn, or CNEL)[1]

Land Use Category	Community Noise Exposure Ldn or CNEL, dB						
	55	60	65	70	75	80	
Residential, Theaters, Auditoriums, Music Halls, Churches							
Transient Lodging – Motels, Hotels							
Schools, Libraries, Museums, Hospitals, Nursing Homes							
Playgrounds, Neighborhood Parks							
Office Buildings, Retail Commercial							
Industrial, Utilities, Manufacturing							
Golf Courses, Outdoor Spectator Sports							

[1]dBA: A weighted decibel scale; Ldn: day-night average noise level; CNEL: community noise equivalent level

COMPLETELY COMPATIBLE – Noise exposure is such that indoor and outdoor environments are pleasant.

TENTATIVELY COMPATIBLE – Noise exposure is great enough to be of concern, but common construction practices would make the indoor living environment acceptable and the outdoor environment reasonably pleasant for recreation. Protective measures should be included as needed to satisfy the policies of the noise section of the General Plan.

NORMALLY INCOMPATIBLE – Noise exposure is so severe that unusual and costly building construction is necessary to ensure some tranquility inside one's home, and barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.
Source: Woodland General Plan 1996.

Major noise sources in the project area are roadway traffic on State and county roadways, particularly I-5; California Northern and Southern Pacific Railroads operations, which generally operate between 7 a.m. and 7 p.m.; planes from the Yolo County Airport, the University Airport at Davis, and Sacramento Metropolitan Airport; agricultural activities; and fixed-noise sources. Fixed-noise sources are a result of many industrial processes, including Adams Grain Dryer, Pacific International Rice Mill, and Woodland Biomass.

Existing background noise levels vary within the project area depending on the proximity to noise sources. I-5 and county roads can produce average noise levels of

approximately 70 decibels at 100 feet. Agricultural fields, while in production, produce noise levels of approximately 78 decibels at 100 feet. Railroads can create noise levels of 75 decibels at 100 feet.

3.3.6 Air Quality

The air quality of a given area is determined by the amount of pollutants released into the atmosphere and the atmosphere's ability to transport and dilute the pollutants. The most important determinants of air pollution transport are wind, atmospheric stability, terrain, and isolation.

Woodland is located within the Sacramento Valley Air Basin, a broad, flat valley bounded by the coastal ranges to the west, the Cascade Range to the north, and the Sierra Nevada to the east. Air entering the Sacramento Valley basin typically comes from the San Francisco Bay/Delta region near the Carquinez Strait. The strong winds over the Delta bring pollutants from the San Francisco Bay area. These pollutants can also be mixed with metropolitan Sacramento-area pollutants while being dispersed northward toward Yolo County.

The frequency of air stagnation is highest in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during these periods and the reduced vertical air flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog, and pollutants near the ground.

The primary air quality problems in Woodland are ozone and suspended particulates (PM_{10}). In the Sacramento Valley Air Basin, ozone is a seasonal problem roughly from May through October and is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon out of the southwest. Usually this evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half the days from July to September, however, a phenomenon called the 'Schultz Eddy' prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern to circle back south toward the Yolo-Solano AQMD. This exacerbates the pollution levels in the district and increases the likelihood of violating Federal or State standards. This eddy will normally dissipate about noon if the Delta sea breeze arrives.

Federal and State standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulates (PM_{10}) and lead. California has also set standards for pollutants not covered by national standards (sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particulates).

The Yolo-Solano Air Quality Management District (YSAQMD) monitors and regulates air quality in the Woodland area and regulates air pollution emissions of

commercial and industrial operations. During the 5-year period between 1989 and 1993, exceedances of the State and Federal standards were recorded in Yolo County for the State/Federal ozone standards and State PM_{10} standards. Both pollutants are regional problems affecting the entire Sacramento Valley Air Basin. Under the Federal Clean Air Act (CAA), Yolo County is designated as "severe" nonattainment for the Federal ozone standard, and attainment or unclassified for other pollutants. Under the California CAA, the county is a "serious" nonattainment area for the State ozone standard, and is also considered nonattainment for the State PM_{10} standard. Table 3-8 shows YSAQMD thresholds and EPA conformity thresholds for criteria pollutants.

The conformity provisions of the Federal CAA were put in place to ensure that Federal agencies would contribute to the efforts of attaining the national ambient air quality standards. The EPA has issued two conformity guidelines: transportation conformity rules which apply to transportation plans and projects, and general conformity rules which apply to all other Federal actions. Conformity determination is only required for the alternative that is ultimately approved and funded. A project that produces emissions that exceed standards would be required to be mitigated. A project would be exempt from the conformity rule if the project-related emissions are less than the *de minimis* thresholds established by the conformity rule.

While emission-control requirements on motor vehicles and industrial operations have substantially reduced air pollution from these sources, increased development and the associated increase in emissions from automobiles threatens to offset these gains.

Woodland contains a multitude of air pollution sources. Motor vehicle exhausts and pesticides are major contributors to the regional ozone problem. Industrial combustion, combustion of natural gas in homes and businesses for space and water heating, and evaporation of paints and solvents are other sources of urban air pollutants. Agricultural lands that surround Woodland generate pollutants from vehicle exhaust, tilling, burning, unpaved road travel, and evaporation of pesticides.

The Yolo-Solano AQMD has permit authority over stationary sources of air pollutants. Major permitted sources in the Woodland area include Adams Schwab & Adams, Contadina, Fosroc, Leer West, Pacific International Rice Mill Inc., and the Woodland Biomass Power Ltd.

Sensitive air receptors are people that are more susceptible to the effects of air pollution than are the general public. Examples of sensitive air receptors include health care facilities, rehabilitation centers, convalescent centers, residences, schools, playgrounds, child-care centers, and athletic facilities. Within the project area, residences are the primary sensitive receptor.

During the summer months, odors can be detected while traveling through the project area, specifically in the Woodland area while traveling on I-5 (odors originate in the industrial area).

Table 3-8. Pollutant Thresholds

YSAQMD Thresholds	
Pollutant	**Threshold**
NO_x	82 lbs/day
ROG	82 lbs/day
PM_{10}	82 lbs/day
CO	550 lbs/day
EPA Thresholds	
Pollutant	**Threshold**
NO_x	25 tons/year
ROG	25 tons/year

3.3.7 Sedimentation and the Settling Basin

The existing settling basin was constructed to minimize the adverse affect on the hydraulic capacity of the Yolo Bypass caused by excess sediment deposition by allowing sediment carried by Cache Creek to settle out before entering the Yolo Bypass. The settling basin is bounded by levees on all sides and covers 3,600 acres. Flows from Cache Creek enter the northwest corner of the settling basin and exit via two structures in the southeast corner of the basin: (1) a 1,700-foot concrete weir and (2) a grated 400 cfs double-box culvert low flow outlet. A training levee adjacent to the west levee ties into the end of the left levee of Cache Creek. The training levee was designed to direct the flow to the southern portion of the settling basin, maintaining the flow velocity and preventing sediment deposition and clogging near the inlet of the basin.

The levee heights and locations have been modified several times to control sediment deposition and increase sediment storage capacity. In 1991, modifications to the settling basin included 50-year storage capacity with an average of 340 acre-feet of sediment accumulation per year. This corresponds to an average trapping efficiency of 55 percent, assuming existing levee project conditions and a Cache Creek channel conveyance of 30,000 cfs. Future modifications include a plan that would raise the 1,740-foot concrete weir in the east levee of the settling basin 6 feet in 2017 or when the basin fills with sediment such that the trap efficiency decreases to less than 30 percent. Modifications also include a plan to remove the training levee in increments to encourage a broader distribution of sediment deposition in the upper portion of the settling basin.

Sediment data has been collected on Cache Creek at a U.S. Geological Survey (USGS) gage near the town of Yolo from 1943 to 1971 (Corps, 1987). Results indicate that 93 percent of the total sediment load at the Yolo gage is suspended sediment, approximately 86 percent of which consists of silts and clays with an average diameter less than 0.064 mm. The annual suspended sediment load into the settling basin between 1904 and 1963 was approximately 675 acre-feet (DWR, 1968). The annual deposition rate in the settling basin from 1934 to 1968 was calculated to be 340 acre-feet, yielding a 50 percent trap efficiency. The 1991 modifications were intended to add an additional 50-

year storage capacity with an average trapping efficiency of 55 percent (assuming existing levee project conditions and a Cache Creek channel storage capacity of 30,000 cfs). A Central Valley Regional Water Quality Control Board (RWQCB) study (1996 to 1998) indicated that the settling basin trapped approximately 50 percent of the mercury and sediments for flows exceeding 730 cfs. However, for flows less than 150 cfs, exports were three to four times higher than the imports entering the basin. Limited testing has been done in the settling basin, but sediments are suspected to consist of relatively high mercury concentrations.

3.3.8 Water Quality

The Cache Creek watershed drains a large area with a wide variety of land uses. These land uses have the potential to contribute to water quality problems such as fecal coliform from septic systems and cattle; boron, mercury and other minerals from geothermal springs and abandoned mines; fertilizers, pesticides, and herbicides from agriculture activities; and sediment from erosion. Although Cache Creek is not used as a municipal drinking water supply, water quality problems do affect wildlife, recreational, and agricultural uses along the creek.

As part of the Cache Creek Resources Management Plan and the Cache Creek Improvement Program, monitoring has been undertaken to establish baseline information on water quality within the creek. Monitoring stations are located at CR 85 (Capay bridge), upstream of Gordon Slough, CR 94B (Stevens bridge), and CR 97B.

Results show that the creek is high in turbidity (sediment) and fecal coliform. Although these results are not unexpected for a highly erosive stream with upstream cattle grazing, they do pose a threat to the overall water quality of Cache Creek. Monitoring results show that fertilizers, pesticides, and herbicides are not contaminating the creek.

There is a local concern about high levels of boron in Cache Creek. Boron is a result of geothermal releases found in the upper reaches of the basin. Concentrations of boron vary depending on the volume of flow in Cache Creek. During low flows in late spring, boron precipitates out on the rocks along the creek. In the fall, when flows increase, boron is diluted and carried into the Yolo Bypass and then to the Sacramento-San Joaquin River Delta. Concentrations of boron are regularly monitored at Capay and Moore dams by the Yolo County Flood Control and Water Conservation District to ensure suitability of the water for agricultural use. Although there are no Federal or State thresholds for boron, the district would not use Cache Creek water until it is nearly free of and boron, which, at high concentrations, can kill English walnut trees and degrade downstream water quality.

Groundwater quality is generally very good except for localized areas containing high boron levels such as along Cache Creek, where boron concentrations in the groundwater are high, ranging from 2 to 4 ppm, in comparison to background levels of 0.6 to 1.0 ppm in other parts of the county. Other localized areas of ground-water contamination are due to (1) nitrates near Dunnigan, east of Woodland, and west of the

University of California at Davis and (2) pesticides near Mace Boulevard north of Putah Creek. Mercury is detected in the groundwater, but is typically at background concentrations.

With regards to human health, the long-term effects of boron exposure remain undetermined. However, on a short-term basis, boron is discharged from the body within a few days of exposure.

The Central Valley RWQCB currently designates Cache Creek as an Impaired Water Body due to high levels of mercury in fish populations. Studies have indicated that Cache Creek is a major source of mercury to the Sacramento-San Joaquin Delta estuary. This has caused concern because this wetland area is a highly favorable environment for methylation. The methylation of mercury is common in anaerobic environments. Methyl-mercury is more bio-available than metallic mercury and can be found in toxic concentrations in species at the top of food chains. Mercury is present throughout the basin, originating from geothermal springs, agricultural runoff, atmospheric deposition, and erosion of naturally mercury-enriched soils. However, the majority of mercury comes from mercury-laden mine and retort wastes. There are three inactive mercury-mining districts in the upper watershed, including Sulfur Bank Mercury Mine at Clear Lake, which is a Superfund site, and the Sulfur Creek and Knoxville mining districts. Elevated mercury concentrations have been observed in invertebrates and fish species sampled from Cache Creek.

The RWQCB is concerned about activity in the Cache Creek watershed that could result in disturbance of mercury-contaminated sediments. This could mobilize the mercury and make it available for biological intake. The streambed between Clear Lake and Rumsey drops about 27 feet per mile (USGS, 1958-92). This steep gradient upstream and broad flat plain in the project area downstream ensures continuous erosion and deposition of mercury-laden sediment. During high flows, much of this mercury-laden sediment is carried farther downstream. The RWQCB identified three patterns of mercury loading during the hydrologic cycles between February 1996 and February 1998 (Foe and Croyle, 1998). The lowest mercury and sediment transport occurred during the summer irrigation period from April to October; during the winter non-runoff periods, mercury export rates from Cache Creek were about 10 to 20 times higher. The highest export rates were measured after large winter storms. Although large storms were relatively infrequent (4 to 10 times a year), these storms appeared to result in the largest portion of mercury exported from the basin.

The Central Valley RWQCB listed Cache Creek on the EPA list of priority water bodies that do not meet beneficial uses. The RWQCB is currently developing the Total Maximum Daily Load (TMDL) limits related to the Cache Creek mercury management strategy, which is to be completed in the summer of 2003 (SWRCB, 2001). The main components of the TMDL are to determine an appropriate target for mercury, identify the sources, determine the load reduction necessary to meet the appropriate target, and to assign the load reduction to various sources with a margin of safety.

The greatest potential source of mercury exposure to humans is through game fish. Health advisories for Clear Lake and the Bay-Delta region concerning the consumption of fish have been adopted. These same advisories should be adhered to within the Cache Creek watershed.

3.3.9 Vegetation and Wildlife

Cache Creek flows roughly east-southeast from Clear Lake for approximately 75 miles out of the Coast Range and into the Sacramento Valley, one of only a few large creeks of the Coast Range that follow this path. Maps and historical descriptions of Cache Creek indicate that the creek was much shallower prior to human disturbance. The riparian corridor was extensive on both sides of the creek, and overbank floodflows frequently replenished the vegetation with nutrients. Native vegetation in the study area was composed of riparian forest, riparian scrub/shrub, valley grassland, oak woodland, and freshwater marsh. The lush riparian forest and wetland systems supported a diversity of wild game and fish. Yolo County derives its name from the Native American word "Yoloy," meaning a place abounding in tules. The first western settlers brought livestock to the Cache Creek region; later, in the mid-1800's, agriculture became a part of the region.

Currently, 35 miles of Cache Creek's upper reach is protected from human encroachment as the Bureau of Land Management's Cache Creek Natural Area. This is a primitive area (no motorized vehicles and no developed campgrounds or facilities) that is managed to protect wildlife and rare plants. This pristine area supports oak woodland, grassland, and chaparral, sustaining the second largest wintering population of bald eagles in California and one of the few free-roaming herds of Tule Elk. Today, the lower reach of Cache Creek flows mostly through private agricultural lands, typically supporting a narrow strip of riparian vegetation.

Riparian vegetation along Cache Creek now consists largely of willow, elderberry, cottonwood, blackberry, and the nonnative tamarisk and giant reed. Between CR 96B and CR 97B and the settling basin, the creek is confined by levees. Within the levees, wild rose, tamarisk, giant reed, sandbar willow, elderberry, wild grape, and cottonwoods can be found. Lower Cache Creek is dry part of the year as a result of a diversion dam constructed near Capay in 1912 and related irrigation diversions. Some riparian vegetation continues to grow on the banks and terraces of the low-flow channel despite limited water availability. Generally, the vegetation grows in narrow strips between 37 and 75 feet wide along both sides of the low-flow channel. The riparian canopy consists mainly of willow, Fremont, black cottonwoods, valley oak, and interior live oak trees. Many of the trees are covered with blackberry and grape vines. Much of the ground cover is made up of California blackberry; western ragweed; sweet anise; curly dock; cocklebur; and several species of thistles, grasses, and forbs. The range of the riparian vegetation is constrained by nearby agricultural activity. Crops cultivated near the creek include rice, wheat, tomatoes, melons, and fruit and nut orchards. The 3,600 acres within the settling basin are also farmed.

Vegetation in the inactive gravel pits is sparse with small patches of dense shrubs. Spring-flowering annual forbs and annual grasses cover much of the area. Emergent wetland communities of cattails, bulrushes, and willows populate some depressions, canals, and drainage ditches. Jurisdictional wetlands may occur within the project area. To date studies have not been conducted to determine their extent. A wetlands delineation would be completed in the PED phase prior to construction to ensure the project complies with all wetlands regulations. There are no other sensitive natural communities within the project area.

A number of wildlife species are associated with the types of habitat available for food, cover, and nesting along Cache Creek. Typically, riparian forest, valley oak woodland, and freshwater marsh are highly productive wildlife areas. Avian species found in these areas include house finch, scrub jay, acorn woodpecker, egret, owl, red-tailed hawk, and Swainson's hawk. Mammalian species found here include deer, coyote, opossum, gray fox, raccoon, western gray squirrel, and muskrat. Migratory waterfowl and raptors use the study area during the winter. Grassland and riparian scrub areas are used by species that feed on seed and vegetation such as the California ground squirrel, California vole, California quail, and American goldfinch. Vertebrate predators in the area include the gopher snake, red-tailed hawk, striped skunk, and fox. Reptilian species include garter and gopher snakes and western fence lizards. Agricultural fields provide foraging and resting areas for Swainson's hawk, red-tailed hawk, Brewer's blackbird, and black-tailed hare. Agricultural fields also provide habitat for western fence lizards, gopher snakes, California ground squirrel, California quail, coyote, skunk, and fox. These species often nest in nearby riparian areas and feed on agricultural field and annual grassland. The creek itself serves as habitat for northwestern pond turtles and giant garter snakes, as well as an assortment of fish.

Lower Cache Creek is within the Pacific Flyway. The Pacific Flyway is used by 10 to 12 million ducks, of which 300,000 winter in the Yolo Bypass and the settling basin. During migration and wintering periods, dabbling ducks such as pintail, teal, and shoveler can be found. Raptors that use the area include golden eagle, northern harrier, red-tailed hawk, short-eared and barn owls, and turkey vulture. Passerine species include the Brewer's blackbird, Lewis's woodpecker, acorn woodpecker, scrub jay, red-shafted flicker, common crow, yellow-billed magpie, tree swallows, rough-winged swallows, and cliff swallows. Over 200 species of birds are known to be seasonal visitors or residents of the riparian community.

Yolo County has developed 41 conservation policies within its 1983 General Plan. Of note is conservation policy #28 which advocates establishing a tree planting program and a tree preservation ordinance. Yolo County has also begun the development of a habitat conservation plan (HCP) to mitigate for future development within the County. This document is still in draft form and as yet has not been adopted. The City of Woodland has stated within its General Plan (1996) that it would participate in the County HCP. The City has also developed 28 other policies to advocate the preservation of wildlife, vegetation and open space. Within these policies the City aims to conserve open space, improve the City's tree cover, encourage the development of open space areas, avoid significant biological resources, ecologically fragile areas and special-status

species, and ensure that landmark and major groves of native trees are protected just to specify a few policies.

3.3.10 Special-Status Species

The Federal Endangered Species Act of 1973 (ESA) (50 CFR 17) provides legal protection and requires definition of critical habitat and development of recovery plans for plant and animal species in danger of extinction. The State provides parallel legal protection in the California Endangered Species Act of 1977 (CESA). The status of an animal or plant is listed as endangered, threatened, or in the case of plants, rare by the ESA and CESA.

Lists of species of special concern based on factors such as limited distribution; declining population size; diminishing habitat acreage or value; or unusual scientific, recreational, or educational value are also maintained by Federal and State agencies. Legal protection for species of special concern is limited as compared to listed species, but these species may be added to official lists in the future if their decline is not halted.

A record of species listed or proposed for listing under ESA for the study area was received from the USFWS in August 2001 and from the National Marine Fisheries Service in December 2001. (An updated list was received from the USFWS as part of its draft Coordination Act Report (CAR) in March 2002.) Table 3-9 (at the end of Chapter 3) includes a compilation of these lists and a literature review of other environmental documents prepared for sites in the study area. This table gives details of potential and documented occurrences of special-status species in the study area, as well as information on habitat requirements and distribution.

The species list provided by the USFWS was used as the basis for determining potentially affected species. Species from the USFWS list, their locations, and their habitat were identified through searches of the California Department of Fish and Game (DFG) natural diversity database (CNDDB), draft Yolo County HCP, Woodland General Plan (1996), and other literature available on the project area. If a species and/or its habitat were located within the project area, this information was compared to the alignment and potential construction zone of the LCCFB and Modified Wide Setback Levee plans. This comparison allowed for the determination of those species potentially affected by the development of this project. These species and their life history requirements are discussed below.

Potentially Affected Species

Giant Garter Snake (*Thamnophis gigas*) – The giant garter snake (GGS) is a State-listed (June 27, 1971) and Federally listed (October 20, 1993) threatened species. It historically ranged throughout the Central Valley, but is currently extirpated from Fresno County southward. During the winter (the snake's dormant season) and at night, it typically inhabits upland areas, small mammal burrows, and other soil crevices. Daytime and active season (early spring through mid-fall) habitats include aquatic sites; emergent vegetation; and grassy banks along agricultural wetlands, irrigation and drainage canals,

sloughs, ponds, small lakes, and low gradient streams. The GGS feeds on fish, amphibians, and amphibian larvae.

Giant garter snakes bare live young between mid-July and September. These young then disperse immediately after birth, thereby eliminating any need by the GGS for nesting sites.

The snake rapidly retreats to water if disturbed.

The decline of the GGS is attributable to habitat loss through flood control and agricultural activities. Critical habitat for the GGS has been proposed (September 9, 2000); however, none occurs within the project area. Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs undertook a field survey for GGS habitat on September 14, 2001. During an October 15, 2001, survey for *Cordylanthus palmatus,* additional observations were made on GGS habitat. The northern boundary of the study area includes an 11-mile reach of lower Cache Creek. The southern boundary is located 0.5 mile north of Kentucky Avenue and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture.

The survey logged five areas of potential GGS habitat: (1) bed and bank of Cache Creek and the levees adjacent to the creek; (2) agricultural ditch between CR 101 and CR 102; (3) agricultural ditch between CR 102 and the Cache Creek west levee; (4) narrow channel east of CR 102 on the south side of the farm road (levee); and (5) agricultural ditch at the base of the north-south segment of the Cache Creek west levee.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) – The Valley elderberry longhorn beetle (VELB), Federally listed (August 8, 1980) as threatened, is entirely dependent on the elderberry (*Sambucus spp.*) as its host plant. The VELB is a wood borer that emerges from late March through June to feed, reproduce, and deposit its eggs within crevices in the bark of the elderberry shrub. Once the larva hatch, they bore into the wood where they spend 1 to 2 years feeding on the shrub's pith before exiting the plant as adults. The adults are active from March to June, mating and feeding on the elderberry leaves and flowers.

The VELB is endemic to Central Valley riparian forests along rivers and streams. These areas are typically the first settled and are often converted entirely for human uses such as agriculture. Some estimates place the extent of destruction at 89 percent for Central Valley riparian forest habitat.

Critical habitat (August 8, 1980) for the VELB does not exist within the project area.

CDM biologist John Downs completed a survey for presence of the VELB. The entire project site was surveyed for the presence of elderberry shrubs. No shrubs were found near the flood barrier project area. In the setback levee project areas where shrubs are expected to be taken, stem sizes, numbers, and beetle presence were estimated at the road crossings. Estimates were made by making a quick count of stems in clumps

occurring less than 100 feet from the project area. Elderberry shrubs were found on both banks of Cache Creek.

Palmate-bracted Bird's Beak (*Cordylanthus palmatus*) – The palmate-bracted bird's beak is a State-listed (May, 1984) and Federally listed (July 1, 1986) endangered annual plant that occurs along the edges of channels and drainages on seasonally flooded, saline-alkali soils below 500 feet. Individuals can also be found in alkali scalds (barren areas with a surface crust of salts) and grassy areas. Currently, seven metapopulations exist in California. Four can be found in the Sacramento Valley, one in the Livermore Valley, and two in the San Joaquin Valley.

The palmate-bracted bird's beak is a hemiparasitic plant. It manufactures its own food, but depends on saltgrass (*Distichlis spicata*) (believed to be its host plant) for water and nutrients. It flowers from May until October, depending upon bees for pollination. It is a highly prolific seed producer, therefore forming a lasting seedbank. However, annual plant numbers vary depending on environmental conditions.

Current population declines result from detrimental land use practices such as agriculture, livestock grazing, and urbanization. Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs undertook a field survey for *Cordylanthus palmatus* habitat on October 15, 2001. During a September 14, 2001, survey for *Thamnophis gigas,* additional observations were made on *C. palmatus* habitat. The northern boundary of the study area includes an 11-mile reach of lower Cache Creek. The southern boundary is 0.5 mile north of Kentucky Avenue and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture. The survey focused on areas mapped as Pescadero silty clay soils. Disturbed alkaline areas within abandoned rice fields south of the flood barrier and east of CR 102 provide some of the best potential habitat in or adjacent to the study area. However, these alkaline habitats are located outside the project boundary and therefore would not be affected by construction.

Central Valley Chinook Salmon (*Oncorhynchus tshawytscha*) – The various runs of the Central Valley chinook salmon were determined by the USFWS and NMFS to be candidate (fall/late fall), endangered (winter), and threatened (spring) species. The chinook salmon is an anadromous and semelparous (spawns only once and then dies) fish that spends up to 2 years as a juvenile in freshwater before returning to the ocean. It then spends up to 6 years in the marine environment before returning to its home stream to spawn and then die.

There are different seasonal runs or modes in the migration of chinook salmon from the ocean to freshwater. The fall/late fall-run chinook salmon was historically found within Cache Creek between July and April. The winter-run chinook salmon was historically found within Cache Creek between December and July. The spring-run chinook salmon would be found within Cache Creek between April and October. Although NMFS considers Cache Creek to be essential fish habitat for the Central Valley fall-run chinook salmon, currently Cache Creek no longer flows directly into the Sacramento River, making it highly unlikely that salmon winter and spawn within the creek at present.

NMFS has determined that Cache Creek serves as essential fish habitat for the Central Valley fall-run chinook salmon.

Steelhead Trout – California Central Valley (CCV) ESU (*Oncorhynchus mykiss*) - The steelhead is currently Federally listed as threatened (March 19, 1998) in the Central Valley region. Steelhead trout are an anadromous form of rainbow trout. The fish spends one to four growing seasons in the ocean before returning to spawn for the first time. Steelhead seek out small streams and tributaries where cool, well oxygenated water and gravelly stream channels occur in order to lay their eggs. Cover in the form of deep pools, overhanging and submerged vegetation, undercut banks, and submerged debris is also important for the protection of spawning and hatching steelhead. The CCV ESU generally spends up to its first 3 years of life in freshwater before migrating to the ocean between March and June. Unlike other anadromous pacific salmonids, steelhead may survive spawning and return to the ocean to spawn again a later year.

Critical habitat was designated for the CCV ESU (February 16, 2000) to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries (NMFS, 1998). This critical habitat included lower Cache Creek; however, an April 30, 2002 court ruling vacated this critical habitat for the CCV ESU.

Swainson's Hawk (*Buteo swainsoni*) – The Swainson's hawk was listed by the State of California as threatened on May 17, 1983. Currently, the species migrates north into California from March through May; breeds from late March to late August in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert; and then returns to Central America by the end of October. The hawk uses scattered, large trees in juniper-sage flats, riparian areas, and oak savannah to raise one brood per year with its monogamous mate. Adjacent grasslands, grain fields, and pastures provide foraging areas for mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and rarely fish.

The Swainson's hawk is considered an uncommon to locally common breeding resident and migrant. A total California population of 375 pairs and 110 breeding pairs was estimated by Bloom (1980). The California Department of Fish and Game (DFG) estimates up to 1,000 pairs occur within the State (Woodbridge, 2001). These numbers signify a decline across the State of up to 90 percent of their historical population (Bloom, 1980). Declines in Swainson's hawk populations are ascribed, in part, to the loss of nesting habitat.

There are numerous documented occurrences of Swainson's hawks within the project area from I-5 eastward and throughout the settling basin. These hawks can be habituated to human activity such as crop cultivation if the activity is consistent. Disturbances, particularly during the breeding season, may include construction actions (a change in current activity routine) and personnel near nesting sites. These disturbances during prenesting, egg-laying, and incubation could result in nest abandonment.

Bank Swallow (*Riparia riparia*) – The bank swallow is a State-listed (June 11, 1989) threatened species that migrates into California from South America in

March through May. The species spends the summer breeding in northern and central California before heading back south for the winter. The swallow is found primarily in riparian and other lowland habitats. It digs nesting holes into vertical banks, bluffs, and cliffs with fine-textured or sandy soils. Foraging habitat includes open riparian areas, brushland, grassland, wetland, water, and cropland.

The bank swallow is considered a locally common to uncommon breeding resident and migrant. The California population totals approximately 100 breeding colonies. The Sacramento River, between Redding and the Yolo Bypass, contained approximately 50 percent of the breeding population as of 1987 (Garrison, 2001).

There are documented occurrences of bank swallows within the project area, including observations of birds in flight by project biologists during site visits. A relatively large breeding population has recently been found along Cache Creek north of the gravel mining areas (T. and J. Heindel, personal communication with Garrison, 2001). Breeding bank swallow populations seem to be fairly tolerant of moderate levels of human activity. Bank swallow susceptibility is primarily tied to habitat losses of their nesting banks from flood damage reduction measures.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*) - The northwestern pond turtle is a California species of special concern. It is common to uncommon throughout California, west of the Sierra-Cascade crest. It inhabits aquatic areas with plentiful hiding and basking sites. A permanent water source is necessary to avoid desiccation, especially for hatchlings. Underwater bottom mud or upland habitat is used for hibernation in colder areas. Upland habitat is used for aestivation and reproduction. The turtle seeks aquatic plant material, beetles, aquatic invertebrates, fishes, and frogs for a food source.

Mating for northwestern pond turtles begins in late April and extends through early May. Oviposition typically occurs during May and June on upland habitats that average 2,300 feet from the turtle's aquatic habitat. The hatchlings, it is assumed, spend the winter within the nest and emerge the following spring. Loss of upland nesting habitat through human disturbance is a potential source for the turtles' decline. There are documented occurrences of the turtle within Cache Creek and various stock ponds of the project area.

3.3.11 Cultural Resources

Cultural resources include buildings, structures, objects, sites, districts, and archeological resources associated with historic or prehistoric human activity. The cultural value of these resources may be of national, state, or local significance and may be listed in, or eligible for listing in, the National Register of Historic Places (NRHP) on the Federal level, or in the California Register of Historic Places as outlined in CEQA. CEQA has similar criteria for the evaluation of the significance of cultural resources to the California Register of Historic Places. If properties are eligible under the NRHP, they are also eligible under the California Register.

For a cultural resource to be determined eligible for listing in the National Register, it must meet certain criteria. The resource has to be at least 50 years old or exhibit exceptional importance and meet one or more of the following criteria as defined in 36 CFR 60.4. It must be (1) associated with events that have made a significant contribution to the broad patterns of our history; or (2) associated with the lives of persons significant in our past; or (3) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (4) has yielded, or may be likely to yield, information important in prehistory or history.

Cultural Context

Prehistory

The earliest known human occupation in or near the study area is from Borax Lake near Clear Lake where radiocarbon dates place the site in the 10,000- to 12,000-year-old range. Artifacts consist of fluted projectile points and chipped stone "cresents," both of which are typical of sites of similar antiquity elsewhere. This was an era when large game hunting was emphasized. Archeological evidence for continuous habitation of the study area is missing until the period of around 2000 B.C. Radiocarbon dates from a prehistoric site in Capay Valley show that both large and small game were being hunted and undoubtedly many vegetable food sources were being used by that period. Populations in the region, as elsewhere in California, continued to increase with the result that technological specialization in economic and ceremonial systems became characteristic. In the latest archeologically distinct period of 500 A.D.-1770 A.D., the bow and arrow became predominant. Acorns had become a staple food source, and all manner of plants, animals, and fish were used for food, basket materials, decorative items, shelter, ceremonial and musical implements, clothing, and other items. There are numerous recorded archeological sites along Cache Creek and the Sacramento River that have provided evidence of a substantial population already in place prior to arrival of non-Native Americans.

Ethnography

"Ethnography" refers to the recent history of the Native Americans of the region from the late 1700's to the early 1900's. The Penutian-speaking Patwin Indians occupied a large area west of the Sacramento River north from the town of Princeton south to the city of Benicia. They were composed of three main groups: the River, Hill, and Southern Patwin. This minor geographic division of the peoples barely represents the extent to which these people were much more geographically and linguistically diverse. They were organized along socio/political lines in small units called tribelets. They existed in the study area until their virtual eradication by the ever-increasing influx of Euro-Americans who took up the land for farms, ranches, and towns. Epidemics of malaria and smallpox in the 1830's also contributed to the rapid decimation of the Patwin.

Before such events, Patwin lived along waterways in permanent villages that varied in size from 50 to 1,000 inhabitants. The larger villages were along the Sacramento River. There is little evidence of occupation away from the streams in the study area although temporary campsites certainly must have been established. A wide variety of food and other resources were available and used, including fish, deer, elk, birds, berries, seeds, and particularly acorns. Trade networks were extensive and included items not present in the study area, such as obsidian from Clear Lake, shell beads from the coast, and salt from farther north. The village of Churup, a Patwin name, was recorded near the town of Yolo. The village of Chila was located near Cache Creek at its lower terminus.

History

Euro-American occupation in the Sacramento Valley is represented first by Spanish interests, then Mexican dominion, and finally by American claim of the region. English fur trappers were present, but English rule of the territory was not. Explorers and trappers entered the Sacramento Valley at least by 1808. Captain Luis Arguello's expedition of 1821 was probably the first near the study area. Alexander McLeod of the Hudson's Bay Company led a hunting and trapping party, and encountered Cache Creek, which they named as such because of the caches of pelts and furs they hid in the banks of the creek. French Camp, on the north bank of the creek about 1 mile downstream from Yolo was one such site (Walters, 1995).

William Gordon, the first major settler in the study area, came to Yolo County in 1842 and claimed the Mexican land grant of Rancho Guesesosi along Cache Creek as his own. His first house, built on the north side of Cache Creek, is long gone. Gordon had to reestablish his claim on the land after 1846 when Alta California became part of the United States. He was issued a patent for the 8,894.49 acres. The rancho boundaries are defined by County Road (CR) 19 on the north, CR 94B on the east, State Highway 16 on the south, and CR 89 on the west. He farmed the property until 1866 (Walters, 1995). Gordon represents the first wave of settlers who acquired large parcels of land for ranching and farming. Agriculture was and still remains the primary industry of Yolo County.

Adjacent to and downstream of Rancho Guesesosi, on both sides of Cache Creek, lay Rancho Rio Jesus Maria, which was taken up by Thomas Hardy in 1843. His ranch covered 6 leagues or 26,000 acres. He died in 1849, and his ranch was bought by James Madison Harbin, James M. Estill, George W. Tyler, and John G. Parrish. They were eventually issued a patent for the land in 1858. Harbin ended up with much of the property and sold off parcels until none remained in his ownership. He and his family lived on the land for about 7 years (Walters, 1995). Rio Jesus Maria was the original name of Cache Creek. On the 1858 surveyor's plat for the ranch, there are four residences, including three upstream of Yolo and one downstream. Later maps show structures in these locations; however, they would have to be field inspected to determine if they represent earlier or later occupations.

The town of Yolo and the city of Woodland are both within the study area. Yolo grew out of a community established on the property of Thomas Cochran, who built a modest inn there in 1849. Later, James A. Hutton acquired some of the property. The Yolo Post Office was officially open in 1853. In 1857, the town of Cacheville, as it was then called, became the Yolo County seat of government. Yolo boasted a newspaper, church, and cemetery, among the other properties and residences. The county seat was moved to Washington (now Broderick) in 1860.

Settlement in Woodland began when John Morris, from Kentucky, moved to the current site of First and Clover Streets in 1849. The area was informally called Yolo City until the wife of Frank S. Freeman named it Woodland as the petition for establishment of a post office was forwarded to Washington, then the county seat (Larkey and Walters, 1987). In 1862, Freeman successfully lobbied to have the county seat moved to Woodland where it has remained since that time (Larkey and Walters, 1987).

Although growth in Yolo County, including the communities of Yolo and Woodland, continued steadily in the mid- and late 1800's, the coming of the railroad to Woodland in 1869 accelerated that development. Growers profited because there was now a ready source to transport produce, particularly grain, to market. By the 1880's, vineyards, orchards, and other crops began to be more important and were planted, sometimes in place of grain (Larkey and Walters, 1987). Farmers such as Camillus Nelson, R. H. Beamer, Harvey Gable, W. B. Gibson, and others prospered and built grand homes in Woodland or in the outlying areas. Some of these are still standing and are within the study area.

No account of the history of Cache Creek can ignore the effect of the gravel mining operations that have been carried out for the last 100 years. This activity has been a significant force in Yolo County economics and has markedly changed the regime of the stream in the upper part of the study area. Some cultural properties are no longer in existence because of the gravel extraction along the creek. Downstream from the gravel mining, Cache Creek has remained in its current course for the last 100 years.

Cultural Resources Investigations

A records and literature search was conducted at the Northwest Information Center at Sonoma State University in March 2001. The quality of earlier site records on file at the Information Center is poor, and with few exceptions, the field data have not been verified. Both the National Park Service's National Register of Historic Places (NRHP) and the California State Department of Parks and Recreation internet sites were checked for historic properties and historical landmarks. Additional information was obtained from archeologist Eric Wohlgemuth (pers comm 2001), who provided unrecorded information on potential prehistoric archeological mounds along or near Cache Creek in the town of Yolo. Historical sources were examined at the Woodland County Library. Assessor's records, maps, and other documents housed at the Yolo County Archives Library were examined with the assistance of several of the library's archivists. Early U.S.G.S. quadrangle maps were reviewed. Local historians contributed information on the Wells Fargo stage station and bank. Published histories of Yolo

County, Woodland, and Knights Landing were read for information on the history of Woodland, Yolo, and other properties in the study area.

Only one archeological survey has been completed in the study area. "An Archaeological Reconnaissance of Cache Creek between Capay and Yolo in Yolo County, California," written in 1978 by Archaeological Consulting and Research Services, Inc., indicates that no sites were located in the study area identified on the Woodland topographic map. Two previously recorded prehistoric archeological sites were probably destroyed sometime before 1978. Site CA-YOL-1 was recorded in 1945 as a 2-acre village site in a cultivated field between Cache Creek and West Adams Canal. CA-YOL-34, recorded as being located on the south bank of Cache Creek in 1959, was probably destroyed by gravel pit operations.

Two prehistoric sites, CA-YOL-38 and -39, were recorded in the late 1940's. They were located just west of the southwestern terminus of the study area in a parcel known as the Adams Grant. CA-YOL-39 is north of Cache Creek, and CA-YOL-38 is south of the creek. CA-YOL-100 is on the north side of the creek, west of State Highway 113. Its current condition is unknown.

Archeological site CA-YOL-187 was recently discovered during swimming pool construction near the town of Yolo. The site appeared to have been located on a low mound. A known prehistoric archeological site is also across Cache Creek from Yolo. Either of these, or even both, sites may be the ethnographic village of Churup.

In 1982, a building inventory was completed of the potentially historic buildings in the city of Woodland (Wirth A.I.A. & Associates/Architects, Inc. 1982). A county-wide survey was completed in 1986. The 1982 inventory identified 32 properties that Wirth recommended for inclusion in the National Register. Two buildings are State Historical Monuments, and five buildings are listed in the National Register. One additional house had been nominated for the National Register. The buildings are listed in Table 3-10.

The National Register Internet site listed three individual historic properties in the city of Woodland, and one historic district. The three individual properties are the R.H. Beamer house at 19 3rd Street, the William B. Gibson house at 512 Gibson Road, and the Hotel Woodland at 426 Main Street. The historic district is the entire Downtown Woodland Historic District, which is on Main Street between Elm and Third Streets. Presumably, the Downtown Woodland Historic District nomination was based on the results of this historic building inventory. There is a discrepancy between the results of the Wirth building inventory and the National Register Internet site.

The Camillus Nelson house on CR 18C, north of Woodland, is listed on the NRHP. This two-story brick residence was built in 1872 and has intact outbuildings.

The Wells Fargo express stop and bank, adjacent to modern farm buildings and a residence, is located near the town of Yolo on the south side of the creek. It was reported as having been built by W. G. Hunt in the 1860's opposite Yolo because high waters in

Cache Creek made crossing to town dangerous and/or impossible (Larkey, pers. comm. 2002). It has not been evaluated for its eligibility to the NRHP and it is not listed as a California Historic Landmark. It is listed in the Yolo County Historic Inventory.

Table 3-10. Historic Building Inventory Results

Current State Historical Monuments	Address
#851 – Woodland Opera House	2nd Street and Dead Cat Alley
#864 – Gable Mansion	659 1st Street
Current National Register Entrants	
Gibson Mansion	Gibson Road
I.O.O.F. Building	3rd and Main Streets
Porter Building	College and Main Streets
Woodland Opera House	2nd Street and Dead Cat alley
Woodland Public Library	1st and Court Streets
Pending National Register Entrants	
R.H. Beamer house	3rd Street

The Spreckels Sugar processing plant is located on CR 18C. Completed in 1937, the plant was designed in the Moderne architectural style. The John E. Taylor residence at CR 99 south of CR 18, Nelson's Grove at CR 99E south of CR 18, and Robinson olive trees lining CR 18A (Best Ranch Road) are all on the Yolo County Historic Inventory. They are located between Woodland and Cache Creek to the north. The Robinson olive trees are 140 years old, and Nelson's Grove is the only extant area of the original oak woodland remaining. Nelson's Grove is both a natural and a cultural resource. None have been evaluated for the NRHP.

Cache Creek Bridge, built in 1921 as part of CR 99, spans Cache Creek between the railroad bridge downstream and I-5 immediately upstream. Neither bridge has been recently evaluated for the NRHP, although the Cache Creek Bridge received a preliminary rating in the 1986 statewide evaluation for significance. Other early railroad lines such as the Oroville Branch, and railroad spurs are shown on earlier maps. Some routes are overlain by modern railroad lines; others were abandoned and no longer exist. None have been evaluated under the NRHP criteria.

Because virtually none of the study area has been systematically examined for historic or prehistoric resources due to real estate constraints, and because many of the structures have not been evaluated for the NRHP, a draft Programmatic Agreement is included (Appendix C) that stipulates the steps that would be taken to be in compliance with Section 106 of the NHPA and 36 CFR 800. The Area of Potential Effect, while broadly drawn at the present, would be refined depending on the selected plan.

3.3.12 Esthetic and Visual Resources

An area's visual character is determined by the variety of its visual features, the quality of those features, and the scope and scale of the scene. The visual components of a particular area consist of such features as landforms, vegetation, manmade structures,

and land-use patterns. The quality of these features depends on the relationship between them and their scale in the overall scene.

The study area is in the valley region, which has its own unique esthetic qualities. This includes the linear and checkerboard pattern of fields, crops, and orchards contrasted by the curvilinear meandering form of the creek and its associated riparian vegetation. The rural/agricultural nature of orchards, croplands, and the occasional farm structure contrasts greatly with the adjacent developed areas of Woodland and Yolo. New warehouses in Woodland are introducing an urbanized scene to the agronomic setting. Orchards, croplands, and the urban areas of Woodland and Yolo characterize the valley portion of the study area. The riparian vegetation adjacent to the levees is visible from the town of Yolo and from I-5. The north Coast Range Mountains and the Sierra Nevada Mountains are visible, but not dominant landscape features, when weather or air quality conditions allow.

There are no State-designated visual resources within the project area. Within the study area, SH 16 is eligible for a scenic highway designation (from Capay to its intersection with SH20); however, this project would have no bearing on its continued candidacy. Nighttime views within the project area are typical of those within an agricultural setting. Sources of light include the city of Woodland, traffic on I-5, and rural residences.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Mammals				
Pacific western big-eared bat (Townsend's big-eared bat), *Corynorhinus (=Plecotus) townsendii townsendii*	SC	Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night, day, hibernation, or maternity roosts. It is most abundant in mesic habitats.	Now considered uncommon, but found throughout California in all but subalpine and alpine habitats. May be found at any season throughout its range.	Potential habitat exists within the study and project areas.
greater western mastiff-bat, *Eumops perotis californicus*	SC	Open semi-arid to arid habitats with crevices in cliff faces, high buildings, trees, or tunnels for roosting	Uncommon in southeastern San Joaquin Valley and Coast Ranges from Monterey County south through southern California, and from the coast eastward to the Colorado desert	Study area is north of this species described range.
small-footed myotis bat, *Myotis ciliolabrum*	SC	Roosts in caves, buildings, crevices, mines, occasionally under bridges and under bark; occurs primarily in relatively arid wooded and brushy uplands near water	Common in arid uplands in California, coastal areas from Contra Costa County south to Mexico, and on the west and east sides of the Sierra Nevada	Study area is outside the species range.
long-eared myotis bat, *Myotis evotis*	SC	Roosts in buildings, crevices, spaces under bark, and snags. Prefers coniferous woodlands and forests but occurs in other habitats as well	Widespread in California but uncommon in most of its range; avoids the Central Valley and desert regions. Occurs along the entire coast and in the Sierra Nevada, Cascades, and Great Basin from the Oregon border south to the Coast Ranges	Study area is outside the species range.
fringed myotis bat, *Myotis thysanodes*	SC	Roosts in buildings, crevices, spaces under bark, and snags. Prefers coniferous woodlands and forests but occurs in nearly all brush woodland and forest habitats	Widespread in California except for the Central Valley and Colorado and Mojave Deserts	Study area is outside the species range.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Mammals (cont.)				
long-legged myotis bat, *Myotis volans*	SC	Roosts in caves, rock crevices, buildings, under tree bark, snags, and mines. Most common in woodlands and forests above 4,000 feet, but also occurs in a variety of other habitats	Common in the Cascades, Sierra Nevada, and Coast Ranges; absent only from the Central Valley and desert regions	Study area is outside the species range.
Yuma myotis bat, *Myotis yumanensis*	SC	Roosts in caves, buildings, mines, crevices, swallows' nests, and under bridges. Prefers open forests and woodlands with sources of water over which to feed	Common and widespread in California; uncommon in the desert region	Likely to occur in study area
San Joaquin pocket mouse, *Perognathus inomatus*	SC	Open, sandy areas with grasses and forbs found on shrubby ridge tops and hillsides	Found between 1,100 and 2,000 feet in the Central Valley	Potential habitat within the study area.
Birds				
mountain plover, *Charadrius montanus*	PT	Alkaline flats, plowed ground, grazed pasture, and dry short grass prairie (foraging); bare flat ground with sparse vegetation (nesting)	Found in the Central Valley south of Sacramento County, southern coastal plains and southern coastal interior valleys.	Documented occurrence north of Cache Creek on Rds 102 & 16, and 101 & 17.
Bald Eagle, *Haliaeetus leucocephalus*	T	Perches high in large, stoutly limbed trees, on snags or broken-topped trees, or on rocks within 1 mile of rivers, streams, and lakes. Roosts communally in winter in dense, sheltered, remote conifer stands.	Breeding range in the northern two-thirds of California, in the Central Coast Range, and on Santa Catalina Island	Breeds within the study area. Foraging habitat does not exist within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Northern spotted owl, *Strix occidentalis caurina*	T	Older forests for foraging, roosting and nesting.	Uncommon permanent resident in the coastal ranges of California from San Luis Obispo to San Diego Co., from Marin Co. north, and in the Sierra Nevada from Plumas Co. through Kern Co. Isolated populations occur in the Santa Cruz and Santa Lucia Mountains.	No suitable habitat within the study area.
Tricolored Blackbird, *Agelaius tricolor*	SC	Marshes, brambles, and non-woody riparian habitats (breeding); marshes, agricultural wetlands, and feedlots (foraging)	Widespread but uncommon throughout most of the Central Valley and coastal areas from Marin County south to San Diego County	Possible transient in the annual grassland and agricultural habitats of the site; breeding habitat is absent. Documented occurrence on Cache Creek west of Woodland
grasshopper sparrow, *Ammodramus savannarum*	SC	Frequents dense, dry or well-drained grassland, especially native grassland with a mix of grasses and forbs for foraging and nesting. Uses scattered shrubs for singing perches.	An uncommon and local, summer resident and breeder in foothills and lowlands west of the Cascade-Sierra Nevada crest from Mendocino and Trinity cos. south to San Diego Co.	Documented occurrence within Yolo County outside the study area.
short-eared owl, *Asio flammeus*	SC	Dense vegetation for roosting and resting cover such as tall grasses, brush, ditches, and wetlands. Open, treeless areas containing elevated sites for perching are also needed	Widespread winter migrant that is found primarily in the Central Valley and the western Sierra Nevada foothills	Documented occurrence within Yolo County outside the study area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Western Burrowing Owl, *Athene cunicularia hypugea*	SC	Drier open rolling hills, grassland, desert floor and open bare ground with gullies and arroyos	Widely distributed throughout the lowland of the State; formerly fairly common in the Central Valley	Possible in the annual grassland habitats of the site
American bittern, *Botaurus lentiginosus*	SC	Feeds in tall, fresh or saline, emergent wetlands; less often in adjacent shallow water of lakes, backwaters of rivers, or estuaries; and occasionally along adjacent shores.	Distributed widely in winter west of the Sierra Nevada. In the Central Valley, fairly common October to April, uncommon to rare rest of year; although breeds there. Elsewhere in lowlands, a rare transient and local winter resident.	Unlikely, only very marginal habitat is present in the study area
Aleutian Canada Goose*, Branta Canadensis leucopareia*	D	Harvested corn fields and flood-irrigated fields (foraging); large marshes, flooded fields, and stock ponds (roosting)	Winters in Butte sink and then migrates to Los Banos, Modesto, and the Delta	Unlikely, only very marginal habitat is present in the study area
Ferruginous Hawk, *Buteo regalis*	SC	Open grasslands in valleys and lower foothills	Southwest Canada and western U.S.; winters in southwest U.S. and northern Mexico; very localized	Possible transient in the annual grassland habitats during winter
Swainson's hawk, *Buteo swainsoni*	CA	Mature riparian forest, lone trees or groves of oaks, and mature roadside trees (nesting); native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands (foraging)	Central Valley (Sacramento, San Joaquin, and Yolo counties) and Great Basin regions; winters in Mexico and Colombia	Documented occurrences within the study and project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Lawrence's goldfinch, *Carduelis lawrencei*	SC	Requires open woodland or shrubland, a nearby source of water, and forb and shrub seeds. Habitats include valley foothill hardwood, valley foothill hardwood-conifer, and, in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montaine. Nearby herbacious habitats often used for foraging.	Rather common along western edge of southern deserts, fairly common but erratic from year to year in Santa Clara Co. (Kaiser 1976) and on coastal slope from Monterey Co. south, and uncommon in foothills surrounding Central Valley.	Documented occurrence in the study area. No documented occurrences within the project area.
Vaux's swift, *Chaetura vauxi*	SC	Roosts in hollow trees and snags, and occasionally in chimneys and buildings. Nests in redwood, Douglas-fir, and occasionally other coniferous forests	Summer resident of northern California. Breeds commonly in the Coast Ranges from Sonoma Co. north, and locally south to Santa Cruz Co.; in the Sierra Nevada; and possibly in the Cascade Range	No suitable habitat within the study area.
black tern, *Childonias niger*	SC	Often nests in dense wetland vegetation; needs fresh water while breeding, but also frequents salt water in migration; forages above wet meadows and fresh emergent wetlands	Currently fairly common migrant and breeder on wetlands of the northeastern plateau area and in spring and summer at the Salton Sea	Unlikely, only very marginal habitat is present in the study area
lark sparrow, *Chondestes grammacus*	SC	Frequents sparse valley foothill hardwood, valley foothill hardwood-conifer, open mixed chaparral and similar brushy habitats, and grasslands with scattered trees or shrubs.	A common to fairly common resident in lowlands and foothills throughout much of California.	Potential habitat exists within the study and project areas.
Northern Harrier *Circus cyaneus*	SC	Annual grassland up to lodgepole pine and alpine meadow habitats. Meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands.	Permanent resident of the northeastern plateau and coastal areas; less common resident of the Central Valley.	Documented occurrence east of Woodland within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Western yellow-billed cuckoo, *Coccyzus americanus occidentalis*	CA	Nests in walnut and almond orchards, however its natural nesting habitat is in cottonwood-tree willow riparian forest	Sacramento Valley portion of the Sacramento River, the Feather River in Sutter County, the south fork of the Kern River in Kern County, and along the Santa Ana, Amargosa, and lower Colorado rivers	Documented occurrence at Willow Slough. No documented occurrence within the project area.
olive-sided flycatcher, C*ontopus cooperi*	SC	Requires large, tall trees, usually conifers, for nesting and roosting sites; also lofty perches, typically the dead tips or uppermost branches of the tallest trees in vicinity, for singing posts and hunting perches.	Uncommon to common, summer resident in a wide variety of forest and woodland habitats below 2800 m (9000 ft) throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins.	Outside of the species described range.
hermit warbler, *Dendroica occidentalis*	SC	Breeds in mature ponderosa pine, montane hardwood-conifer, mixed conifer, Douglas-fir, redwood, red fir, and Jeffrey pine habitats. In migration and winter, also occurs in valley foothill hardwood habitat and in stands of planted pines.	Breeds in major mountain ranges from San Gabriel and San Bernardino Mts. northward, excluding coastal ranges south of Santa Cruz Co. Uncommon to fairly common in lowlands in spring, rare to uncommon in fall.	Potential migrant within the study area.
snowy egret, *Egretta thula*	MB	Shores of coastal estuaries, fresh and saline emergent wetlands, ponds, slow-moving rivers, irrigation ditches, and wet fields	Widespread in California. In northern California, common March to November in coastal lowlands. Locally common in the Central Valley all year.	Potential habitat exists within the study and project areas.
white-tailed (=black shouldered) kite, *Elanus leucurus*	SC	Rarely found away from agricultural areas. Substantial groves of dense, broad-leafed deciduous trees used for nesting and roosting. Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands.	Common to uncommon, yearlong resident in coastal and valley lowlands.	Potential habitat exists within the study and project areas.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
little willow flycatcher, *Empidonax traillii brewsteri*	***	Wet meadows and montane riparian habitats from 600 to 2,440 m.	Tulare County north, along the western side of the Sierra Nevada and Cascades, extending to the coast in northern California.	Does not occur within the project area.
American peregrine falcon, *Falco peregrinus anatum*	D	Nesting and wintering habitats are varied, including wetlands, woodlands, other forested habitats, cities, agricultural areas and coastal habitats	Most of California, except in deserts, during migrations and in winter	Potential habitat exists within the study and project areas.
common loon, *Gavia immer*	SC	Estuarine and subtidal marine habitats	Common along entire coast. Uncommon on large, deep lakes in valleys and foothills	Suitable habitat is absent from project site
greater sandhill crane, *Grus canadensis tabida*	CA	Wet meadows that are often interspersed with emergent marsh. It frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands.	Nest in Lassen, Modoc, Plumas, Shasta, Sierra, and Siskiyou counties. It winters primarily in the Sacramento and San Joaquin valleys from Tehama Co. south to Kings Co.	Rare transient.
loggerhead shrike, *Lanius ludovicianus*	SC	Open habitats, with shrubs, trees, posts, fences, utiliy lines, or other perches. Highest density occurs in open-canopied valley foothill woodland, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats.	A common resident and winter visitor in lowlands and foothills throughout California.	Potential habitat exists within the study and project areas. Documented occurrence east of Woodland.
least bittern, western, *Lxobrychus exilis hesperis*	SC	Uses dense, emergent vegetation for cover and nesting, and feeds in such vegetation, as well as in small openings. Often feeds along the edge of emergent vegetation, on the open-water side.	In southern California, common summer resident. Rare to uncommon April to September in large, fresh emergent wetlands of cattails and tules in Central Valley, where it nests; and on northeast plateau, where it probably nests.	Rare documented occurrence within Yolo County.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Lewis' woodpecker, *Melanerpes lewis*	SC	Open oak savannahs, broken deciduous, and coniferous habitats with brushy understory, and scattered snags and live trees for nesting and perching.	Eastern slopes of the Coast Ranges south to San Luis Obispo Co. Also winters in the Central Valley, Modoc Plateau, and the Transverse and other Ranges in southern California. Breeds locally along eastern slopes of the Coast Ranges, and in the Sierra Nevada, Warner Mts., Klamath Mts., and in the Cascade Range.	Documented occurrence in the Capay Valley.
long-billed curlew, *Numenisus americanus*	SC	High salt marsh, pastures, salt ponds for roosting during high tide periods. Nests on elevated interior grasslands and wet meadows, usually adjacent to lakes or marshes	Uncommon to fairly common breeder in northeastern California in Siskiyou, Modoc, and Lassen counties. Uncommon to locally very common in winter along most of the California coast, and in the Central and Imperial valleys	Suitable habitat is absent from project site
White-faced Ibis, *Plegadis chihi*	SC	Freshwater marshes with tules, cattails, and rushes; may nest in trees and forage in flooded agricultural fields	Nests in Yolo and Colusa Counties and other isolated areas in the Central Valley; wintering concentrations in Colusa, Merced, and Yolo Counties	Documented occurrence at the Woodland Sugar Ponds.
bank swallow, *Riparia riparia*	CA	Sandy, vertical bluffs or riverbanks (nesting)	Mostly on the banks of Central Valley streams, including several colonies on the Sacramento River. Scattered populations in parts of Inyo and Mono counties and northern, north coastal, and central coastal regions	Documented occurrence at Sacramento River Fremont Weir. Sitings along Cache Creek downstream of I-505 and Rd 89.
rufous hummingbird, *Selasphorus rufus*	SC	Riparian areas, open woodlands, chaparral, mountain meadows, and other habitats rich in nectar-producing flowers, including gardens and orchards.	A common migrant and uncommon summer resident of California. Spring migration mostly is through the lowlands and foothills.	Potential habitat exists within the study and project areas.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
red-breasted sapsucker, *Sphyrapicus rubber*	SC	Most numerous in riparian, deciduous hardwood, or in mixture of hardwood and conifer habitats. Frequents sparse to moderate canopy with suitable snags for nest and roost excavation, especially in vicinity of aspens, wet meadows, clearings, lakes, and other open habitats.	Occurs from Oregon border south in Coast Ranges and along coast to Marin Co., and along both the eastern and western slopes of the Cascade Range and Sierra Nevada south to Kern Co. In southern California, an uncommon summer resident locally in the higher mountains. A fairly common winter resident throughout much of lowland, cismontane California.	Potential habitat exists within the study and project areas.
Bewick's wren, *Thryomanes bewickii*	SC	Chaparral. Natural cavity or rock crevice for nesting. Dense shrubs, thickets, slash piles used for cover and foraging.	Common resident throughout the state except in subalpine conifer habitat in the Sierra Nevada and drier portions of the southeastern deserts.	Potential habitat exists within the study area.
California Thrasher, *Toxostoma redivivum*	SC	Moderate to dense chaparral habitats and, less commonly, extensive thickets in young or open valley foothill riparian habitat.	Occurs from Mexican border north to Shasta, Trinity, and southern Humboldt cos., and into the Shasta Valley of Siskiyou Co.	Documented occurrences within the Capay Valley and at Rd 89 at Cache Creek.
Reptiles				
giant garter snake, *Thamnophis gigas*	T	Permanent freshwater, especially sloughs and marshes overgrown with tules of willows	Central Valley including Butte, Colusa, Yolo, Sacramento, Solano, San Joaquin, Stanislaus, Merced, and Fresno Counties	Marginal habitat exists within the project area.
northwestern pond turtle, *Clemmys marmorata marmorata*	SC	Associated with permanent or nearly permanent water bodies with abundant cover and basking sites	Parts of Washington, Oregon, Nevada, and California; below 5,000 feet	Observed in the stock pond and stream habitats of the site
Amphibians				
California red-legged frog, *Rana aurora draytonii*	T	Quiet, permanent water in woods, forest clearings, riparian areas, and grasslands	Coast Transverse, Sierra Nevada, and Cascade Ranges	Project area is outside of current species range. Study area is within the historic range.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Amphibians (cont.)				
California tiger salamander, *Ambystoma californiense*	C	Grasslands with long-lasting rain pools and dry-season refuge sites. Also occurs in grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats.	Sonoma and Santa Barbara counties, on each side of the Central Valley from southern Colusa County south to northern Kern County and in the coast ranges from Suisun Bay south to the Temblor Range	Marginal habitat exists within the project area.
foothill yellow-legged frog, *Rana boylii*	SC	Rocky streams in valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow habitat types	Most of northern California west of the Cascade crest, along the western flank of the Sierra south to Kern Co., and Coast Ranges from northern California to Ventura County	Project area is outside of current species range. Study area is within the historic range.
western spadefoot toad, *Spea hammondii*	SC	Prefers grassland, scrub and chaparral with temporary pools but could occur in oak woodlands	Central Valley, bordering foothills, and coastal ranges; southwestern United States	Marginal habitat exists within the project area.
Fish				
winter-run Chinook salmon, *Oncorhynchus tshawytscha*	E	Ocean and coastal rivers and streams	Sacramento River and tributaries; SF Bay/Delta estuary and the open ocean	Highly unlikely. Only during high water flows of the Sacramento River.
critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha*	E	Freshwater rivers and streams	Sacramento River, tributaries, distributaries, and related riparian zones from Keswick Dam downstream to and including SF Bay	Does not occur within the study area.
delta smelt, *Hypomesus transpacificus*	T	Estuarine areas with salinities below 2 grams per liter; spawns in freshwater	Delta estuary from Suisun Bay upstream to the Delta cross channel on the Sacramento River and south along the San Joaquin and Middle River to the south end of Bacon Island	Not likely, found well downstream of the project area

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Fish (cont.)				
critical habitat, delta smelt, *Hypomesus transpacificus*	T	areas of all water and all submerged lands below ordinary high water and the entire water column bounded	Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained within the Delta, as defined in section 12220 of the California Water Code	Does not occur within the study area.
Central Valley steelhead, *Onchorynchus mykiss*	T	Ocean and freshwater rivers and streams	Sacramento River and tributaries; SF Bay/Delta estuary and the open ocean	Observed in study area, spawns upstream in wet years
Sacramento splittail, *Pogonichthys macrolepidotus*	T	Sloughs and backwaters for the SF Bay Delta and adjacent Sacramento River	The SF Bay Delta and adjacent Sacramento River	Does not occur within the study area.
Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha*	T	Ocean and freshwater rivers and streams	Sacramento River and tributaries downstream to and including SF Bay to Golden Gate Bridge	Highly unlikely. Only during high water flows of the Sacramento River.
Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha*	T	Accessible river reaches, adjacent riparian zones, and estuarine areas.	River reaches accessible to listed chinook salmon in the Sacramento River and its tributaries in California. Adjacent riparian zones, as well as river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge	Does not occur within the study area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Fish (cont.)				
Central Valley Fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha*	C	Ocean and freshwater rivers and streams	Sacramento and San Joaquin Rivers and tributaries downstream to and including SF Bay to Golden Gate Bridge and the Pacific Ocean	Historical occurrence in Cache Creek to Capay Dam after high water in the Sacramento River
Essential Fish Habitat, Central Valley Fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha*				Cache Creek has been designated as Essential Fish Habitat.
Green sturgeon, *Acipenser medirostris*	SC	Estuaries; spawns in freshwater	Widely distributed in salt water; freshwater in lower reaches of large rivers from Sacramento-San Joaquin River system north	Highly unlikely, this fish occurs in large rivers and spawns in >3 feet of water
river lamprey, *Lampetra ayresi*	SC	Coastal streams and ocean	From Alaska to San Francisco Bay; most abundant in the lower Sacramento-San Joaquin River system	Highly unlikely
Pacific lamprey, *Lampreta tridentata*	SC	Ocean and freshwater rivers and streams. In freshwater prefers gravel and rocks, and occassionally sand.	Baja California, to the Bering Sea in Alaska and Asia.	Highly unlikely
longfin smelt, *Spinichus thaleichthys*	SC	Estuaries; euryhaline species, can survive in salt water and freshwater	Pacific Coast estuaries and Sacramento-San Joaquin delta; most abundant in San Pablo and Suisun Bays although spawns in upper end of Suisun Bay and lower reaches of the Delta; small population in Humboldt Bay and the Eel River	Highly unlikely, rarely found upstream from the delta
Invertebrates				
Conservancy fairy shrimp, *Branchinecta conservation*	E	Vernal pools with highly turbid water	Vina Plains, Tehama County, south of Chico, Butte County, Jepson Prairie, Solano County, Sacramento National Wildlife Refuge, Glenn County, near Haystack Mountain, Merced County, and Lockewood Valley, Ventura County	No vernal pool occurrence within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Invertebrates (cont.)				
vernal pool tadpole shrimp, *Lepidurus packardi*	E	Vernal pools and swales containing clear to highly turbid water	Sacramento Valley from Butte County to south of the Sacramento area in Sacramento County and west to the Jepson Prairie region of Solano County	No documented occurrence within the project area.
vernal pool fairy shrimp, *Branchinecta lynchi*	T	Vernal pools in grass or mud bottomed swales, earth sumps, or basalt flow depression pools in unplowed grasslands	Tehama County south through most of the Central Valley and along the south and central Coast Ranges to Santa Barbara County	No documented occurrence within the project area.
valley elderberry longhorn beetle, *Desmocerus californicus dimorphus*	T	Elderberry shrubs in moist valley oak woodlands along the margins of streams and rivers	Northern San Joaquin and southern Sacramento valleys	Evidence (emergence holes) of this species has been observed on the project area.
Antioch dunes anthicid beetle, *Anthicus antiochensis*	SC	Loose, sandy soils occurring as dunes or along riparian areas	Antioch Dunes Preserve	No documented occurrence within the project area.
Sacramento anthicid beetle, *Anthicus sacramento*	SC	Loose sandy soils occurring as dunes or along riparian areas	Sacramento, Solano, and Butte Counties	No documented occurrence within the project area.
Midvalley fairy shrimp, *Branchinecta mesovallensis*	SC	Vernal pools and temporary ponded waters without fish.	California Central Valley	No documented occurrence within the project area.
California linderiella fairy shrimp, *Linderiella occidentalis*	SC	Vernal pools in grass or mud bottomed swales, earth sumps, or basalt flow depression pools in unplowed grasslands	Scattered locations in the Central Valley from east of Red Bluff in Tehama County to east of Tulare in Tulare County, across the Sacramento Valley to the San Francisco Bay, along the Coast Range from Mendocino County to	No documented occurrence within the project area.
Plants				
palmate-bracted bird's beak, *Cordylanthus palmatus*	E	Saline-alkaline soils and is a component of alkali sink scrub vegetation in relatively undisturbed, seasonally flooded lowlands	Populations occur at Delevan, Colusa and Sacramento National Wildlife Refuges. Also in Yolo, Madera, Alameda and Fresno Counties.	Documented occurrence near Woodland. No documented occurrence within project area.
Colusa grass, *Neostaphia colusana*	T	Occurs only on the muds of large or deep vernal pools	Merced, Stanislaus, Solano, and Yolo counties	Vernal pools absent from project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Plants (cont.)				
Solano Grass (Crampton's tuctoria), *Tuctoria mucronata*	E	Grows in the clay bottoms of vernal pools	Currently known from two vernal lakes within the Jepson Prairie, Solano County	Vernal pools absent from project area.
alkali milk-vetch, *Astragalus tener* var. *tener*	SC*	Valley grassland, alkali sink, vernal pool	Known only from Merced, Solano, and Yolo counties.	Documented occurrrence southeast of Woodland at Willow Slough. No documented occurrence within the study area.
Ferris's milk-vetch, *Astragalus tener* var. *ferrisiae*	SC*	Playas or clay soils in valley grassland, meadows, and seeps.	Found in scattered localities throughout the Sacramento Valley	Does not occur within the project area.
brittlescale, *Atriplex depressa*	SC	Shadscale scrub, valley grassland, alkali sinks. Clay alkaline soil on alkaline substrate in playa habitats.	Found in scattered localities throughout the Central Valley	Documented occurrence east of Woodland.
valley spearscale, *Atriplex joaquiniana*	SC*	Shadscale scrub, valley grassland, meadows and seeps. Alkaline soil on alkaline substrate in meadow habitats.	Found in scattered localities throughout the Central Valley	Documented occurrence east of Woodland.
Snow Mountain buckwheat, *Eriogonum nervulosum*	SC	Serpentine substrate in chaparral habitat	Found in Glenn, Colusa, Yolo, Lake, Napa, Sonoma	Serpentine habitat does not exist within the project area.
adobe lily, *Fritillaria pluriflora*	SC	Clay soil in chaparral, valley grassland, foothill woodland	Foothills of northwest Sierra Nevada and north Coast Ranges.	Does not occur within the project area
drymaria dwarf-flax, *Hesperolinon drymarioides*	SC	Serpentine substrate in chaparral, valley grassland, foothill woodland, closed-cone pine forest.	Found in Glenn, Colusa, Yolo, Lake, Napa, and Mendocino counties.	Serpentine habitat does not exist within the project area.
Northern California black walnut, *Juglans californica* var.*hindsii*	SC*	Riparian forest, Riparian woodland	Found throughout the State of California.	Potential habitat exists within the study area.
Heckard's peppergrass *Lepidium latipes* var.*heckardii*	SC	Alkaline flats in valley grassland	Found in Glenn, Yolo, and Solano counties.	Documented occurrence near Woodland. No documented occurrence within project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Plants (cont.)				
Hall's madia, *Madia hallii*	SC	Serpentine chaparral. Dry, sunny, rocky, ultramafic, brushy or grassy slopes/ & ridgetops; in serpentine formations.	Known only from Colusa, Lake, Napa, and Yolo Counties.	Serpentine habitat does not exist within the project area.

Key:		
E	Endangered	Listed (in the Federal Register) as being in danger of extinction.
T	Threatened	Listed as likely to become endangered within the foreseeable future.
P	Proposed	Officially proposed (in the Federal Register) for listing as endangered or threatened.
PX	Proposed	Proposed as an area essential to the conservation of the Species.
C	Candidate	Candidate to become a proposed species.
SC	Species of Concern	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time
MB	Migratory Bird	Migratory Bird
D	Delisted	Delisted. Status to be monitored for 5 years.
CA	State-Listed	Listed as Threatened or endangered by the State of California.
*	Extirpated	Possibly extirpated from this quad.
**	Extinct	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.
***	Unlisted	Included on the USFWS species list as CA